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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 125, NO. 11 SEPTEMBER 12, 1949

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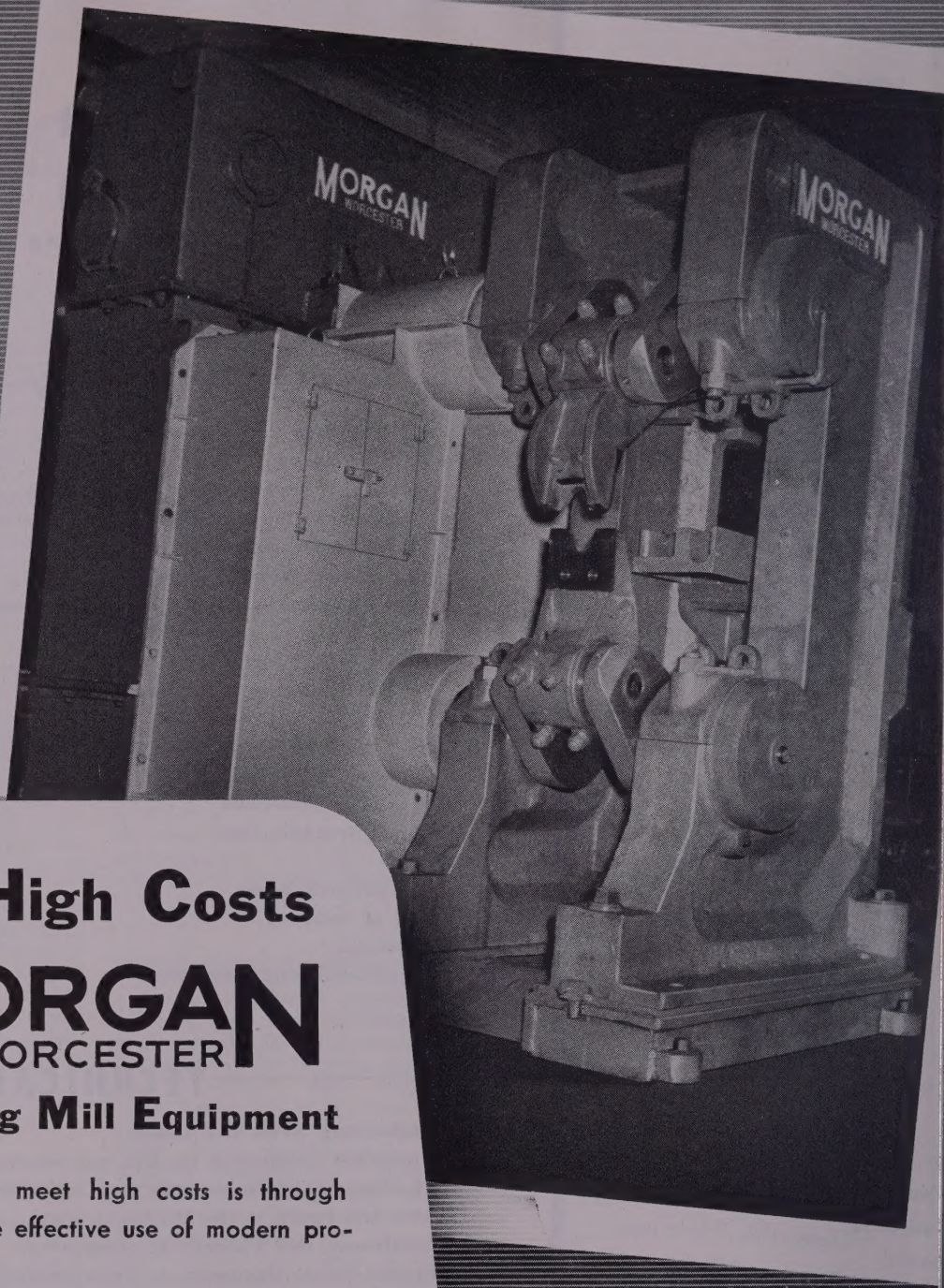

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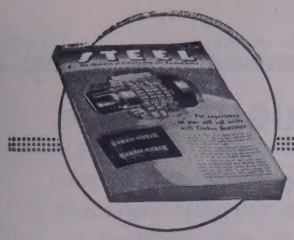

September 12, 1949

Clarification Near

Businessmen who are concerned about their plans for the early future are trying to interpret the significance of the present state of the national economy, which in many respects is better than had been anticipated only a few months ago. Specifically, they are attempting to ascertain just how the current improvement in general business sentiment fits into the traditional pattern of this nation's postwar economic cycles.

Many business analysts take it for granted that following a great emergency such as the recent war, our national economy goes through three distinct phases—first, a boom immediately following the end of hostilities; second, a shakeout or adjustment period; and third, an era of expansion with relatively high stability.

Experts believe the boom period, characterized by a sellers' market, acute shortages and gray markets, extended from V-J Day to about August 1948. The shakeout or adjustment phase probably began in September 1948. It was characterized by the dawn of a buyers' market, with lower prices, more abundant supplies, greater price consciousness, reduced inventories and other corrections.

This shakeout process is still going on. The cycle will not be complete until all important business groups have gone through the cleansing process of readjustment. The automobile industry, for instance, has yet to experience this painful ordeal. Some authorities think that the end of the shakeout cycle may be witnessed early in 1950. Whenever the end of the adjustment process arrives, the third or expansion period will begin. It should witness fairly stable prices, higher quality of goods, increased productivity, modernization, new products and new processes and perhaps important new industries.

Right now speculation as to when the second phase will end and the third will begin is complicated by the well grounded suspicion that possibly today's optimistic feeling springs from an upturn in some businesses which is caused largely by heavy precautionary buying in anticipation of strikes. In view of the doubts arising from this possibility, events of the next few weeks will be watched carefully for signs that will help clarify the economic picture.

If the major disputes now awaiting settlement can be resolved without strikes, the work of economic weathermen during the next few months will be simplified appreciably.

* * *

COUNT COST IN ADVANCE: In spite of the fact the CIO Auto Workers were on strike at Ford Motor Co. for 23 days in May, Walter Reuther now is threatening a new walkout. This has prompted the Detroit Board of Commerce to publish full-page advertisements urging all parties concerned in the current dispute to come to terms without a strike.

Supporting this plea is a statement in the advertisements that last May's Ford strike cost the nation $243,000,000. In publicizing this heavy loss, which never can be regained, the board points out that another strike at this time would entail additional great losses to employees, company, merchants, professions, suppliers and many others and would deprive local, state and federal governments of tax revenue. "How much better it would be," states the advertisement, "to compute the costs in advance—the net cost to everyone—before the suffering caused by strikes is actually experienced."

This argument is applicable to all labor disputes. One wonders how much the attitude of employees as expressed in their votes to strike

(OVER)

or not to strike would be influenced if each worker were to figure out in advance just what a strike would cost him and his family. Also, to what extent would public opinion be affected by a statement of probable losses, published in advance? —p. 79

* * *

CUTS WITH NO CHIPS: On a new machine belonging to the single spindle, heavy duty, high speed "bar feed" lathe family, but which is designed from the floor up for the primary purpose of chamfering and cutting off pipe and tubing, a sharp-edged disk is used to cut off the tubing or pipe instead of the conventional parting tool.

This revolving disk, usually from 5½ to 7 inches in diameter, moves in, rolls momentarily with the work and then "incises" it off without chip formation. This seemingly simple operation may have many other applications because it is obvious that the "incising" technique eliminates the loss of metal in the kerf which results from the use of an ordinary parting tool. This saving of metal on a single cut is small but on large runs of repetitive work it could mount into figures that would be important. —p. 113

* * *

AGENTS GAIN IN SALES: One significant straw in the wind of changing times is the apparent tendency among manufacturers to entrust more of the sales burden to manufacturers' agents. In 1939 about 3500 agents handled metalworking products. Their sales totaled about $490 million. Today the number of agents exceeds 3500 and their sales are well over $1 billion a year.

The improved position of the manufacturers' agent is due largely to the economic conditions of the period. Small and moderate sized manufacturers, who have been handicapped by high cost of selling through their own organizations, have turned to the agents for relief. Tax laws in some states have accentuated this preference. Another compelling factor is that the agent is paid only if he sells; the branch sales office is a recurring expense, regardless of volume.

This may be a temporary situation, but it is typical of the expedients employed in a period of economic adjustment. It may lead to a better appreciation of the important role that agents can play in distribution. —p. 80

BOTH COULD BE RIGHT: E. R. Breech, executive vice president of Ford Motor Co., and R. E. Olds, eminent pioneer in motordom, are engaged in a friendly argument concerning the appointments and prices of today's automobiles.

Mr. Olds has stated that the current models are loaded up with too many frills and gadgets and that somebody in the industry should be making cars to sell under $1000. Undoubtedly there are thousands of potential automobile buyers who would like to think that Mr. Olds is right.

However, Mr. Breech claims that the so-called gadgets which adorn today's cars are actually demanded by the customers. He makes the picturesque statement that the American public is not ready to "take a lower standard of living in its automobiles." Moreover, he says, 25 per cent of the selling price of autos goes for taxes.

Mr. Olds probably is sound on logic and Mr. Breech probably is equally sound on the vagaries of public taste. —p. 92

* * *

WINS OUT IN 8 YEARS: Every now and then a process that has been firmly established for decades gives way to a new competitor. The output of open-hearth steel exceeded that of bessemer steel for the first time in 1908 and has held a commanding lead ever since. Production of by-product coke overtook that of beehive coke in 1919 and has increased its margin of lead considerably since then.

Now it is estimated that production of electrolytic tin plate in 1949 will total 2 million net tons as against an output of 1.8 net tons of hot dip tin and terne plate. In 1941 all production was by the hot-dip process. Thus in a brief span of 8 years, the electrolytic process has advanced from 0 to about 53 per cent of total output.

Shortages of tin, plus the fact the electrolytic process permits thinner coatings of tin, has speeded the rise in popularity of the electrolytically plated product. —p. 88

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

EXPANSION AHEAD?—America's postwar economy—now in a three-stage business sequence common after war—may be shifting from the second, shakeout period to the third, expansion phase, barring war, strikes or government intervention (p. 77). Business analysts suspect this transition may be completed early in 1950 because of the strong and sustained power of the business revival, sharp gains in employment and renewed demand for castings, appliances and other industrial products. Characteristics of this third postwar stage could be stable prices, a buyers' market, general expansion led by some bellwether industry, emergence of a new industry like synthetic fuels or atomic power. One factor which may delay the transition is the unique situation in the automotive field, still in the first, boom phase. Shakeout period for autos (p. 91) remains in the future as alltime production records tumble and demand holds.

LABOR—While steel producers hope and expect that a strike can be averted, blueprints were readied last week for the orderly closing down of facilities should the union call a walkout (p. 79). Steel consumers are watching developments anxiously, and counting their steel stocks. Majority of metalworking plants report stocks are adequate for 30 days or more, although a considerable number have only 10 to 20 days' supply on hand . . . Detroit Board of Commerce is publicizing the $243 million losses of the Ford strike last May in hopes of averting a new walkout.

PITTSBURGH HIT—Steel operations in the Pittsburgh district are lagging below those of other districts (p. 81). Many believe this results largely from the f.o.b. mill pricing system, although Western Pennsylvania's product mix is admittedly in lighter demand than the items produced elsewhere and a larger proportion of facilities are of the older type. Hopes for a green light on freight absorption are dimming (p. 82) as result of restrictive amendments attached to the O'Mahoney bill.

TRUCK LOADS—In a move which will have economic as well as safety significance, truckers have agreed with the Interstate Commerce Commission to limit loads of iron and steel products (p. 80). Railroads in particular have long complained that evasion of load limit laws has given truckers an unfair rate advantage.

MACHINE TOOL CRIMP—Government policies are crimping machine tool sales, builders say (p. 83). Refusal to grant export licenses for Eastern European destinations is fine in theory, builders claim, but not in practice. What happens is that Western European machine tool competitors, unhampered by such restrictions, are selling their products in Eastern Europe and seizing potential American markets.

MORE CANS—Controls on tin—they were just eased considerably by the Commerce Department—have been more stringent and in force longer than for any other raw material used by metalworking industry (p. 88). Nevertheless, can and tin plate production has increased, largely because of the rapid development of electrolytic plating methods which permits thinner tin coatings. Electrolytic, not produced commercially at all in 1941, topped hot-dip tin plate production for the first time in the initial six months of this year.

HERE AND THERE IN INDUSTRY—Manufacturers' agents are playing an increasingly important role in the metalworking industry's drive to meet the buyers' market (p. 80) . . . Republic Steel Corp. has closed down alloy steelmaking facilities in Massillon, O. (p. 82) . . . Federal aid for depressed areas will be limited to giving government contracts to companies in the territory affected (p. 84) . . . Domestic output of mercury, tungsten, antimony and manganese is sinking because of high costs (p. 89) . . . Galvanizing pots at Apollo Steel Co. will be reactivated this week to coat 4000 to 5000 tons monthly of flat and corrugated sheets rolled elsewhere for the government's grain storage bin program.

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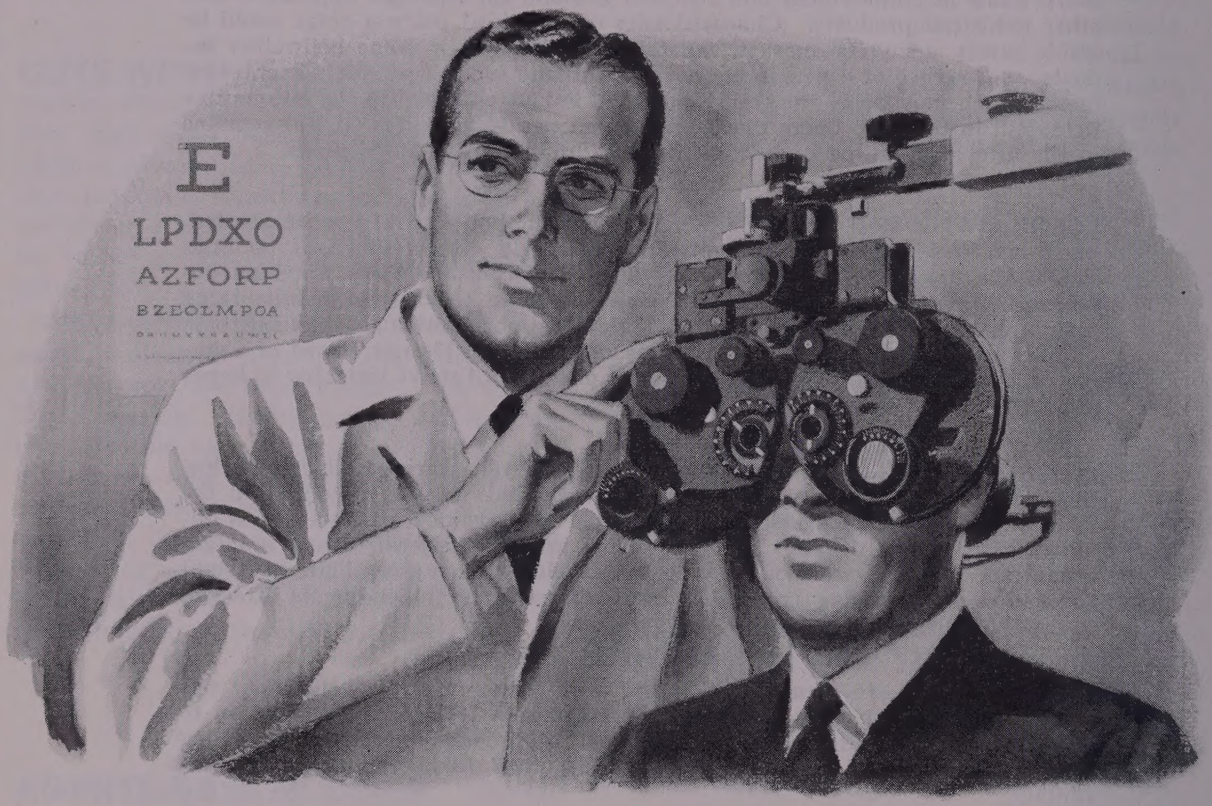

Like a trained optometrist fitting glasses to the individual needs of his patient, Inland prepares steel—job-fitted to your individual manufacturing needs. This service can be rendered because of Inland's position as a completely integrated producer whose centralized facilities enable prompt decisions. Making steel to your specifications, acting quickly when fast action is necessary, treating every order with friendly, personal interest, and carefully checking your steel through each phase of production are both policy and practice at Inland.

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Industry Expansion Phase Coming?

Traditional three-stage sequence of America's postwar economy now in second, shakeout period. Transition to third, expansion phase may be completed early in 1950

BUSINESS MEN are speculating on the probable course of events in the approaching third act of America's postwar economic drama.

U. S. economy traditionally progresses through a series of three stages right after war: 1. Immediate boom; 2. shakeout; 3. expansion. Indications are that the shakeout period may be ending and the advance guard of the expansion phase already with us. Business analysts predict that possibly early in 1950 the transition from the second to third stage will be practically completed.

Basis for this optimism is the surprisingly strong and sustained power of the business revival in some industrial lines, an upturn first noted by STEEL six weeks ago. Increased steel buying, at first thought merely strike insurance, was motivated more naturally by a surge in demand for metalworking products. Employment is increasing. Castings output is showing spotty but significant gains. Appliance demand shows new strength as do many other metalworking products.

Characteristics — The third act could contain these elements: Reasonably stable prices, improved quality of goods, new engineering facilities for economic development, increased productivity, modernization of plants and processes, new products, new industries, competitive selling, improved marketing methods, rapid expansion of particular industries which can serve as bellwethers for general expansion (perhaps synthetic fuels or industrial applications of atomic energy).

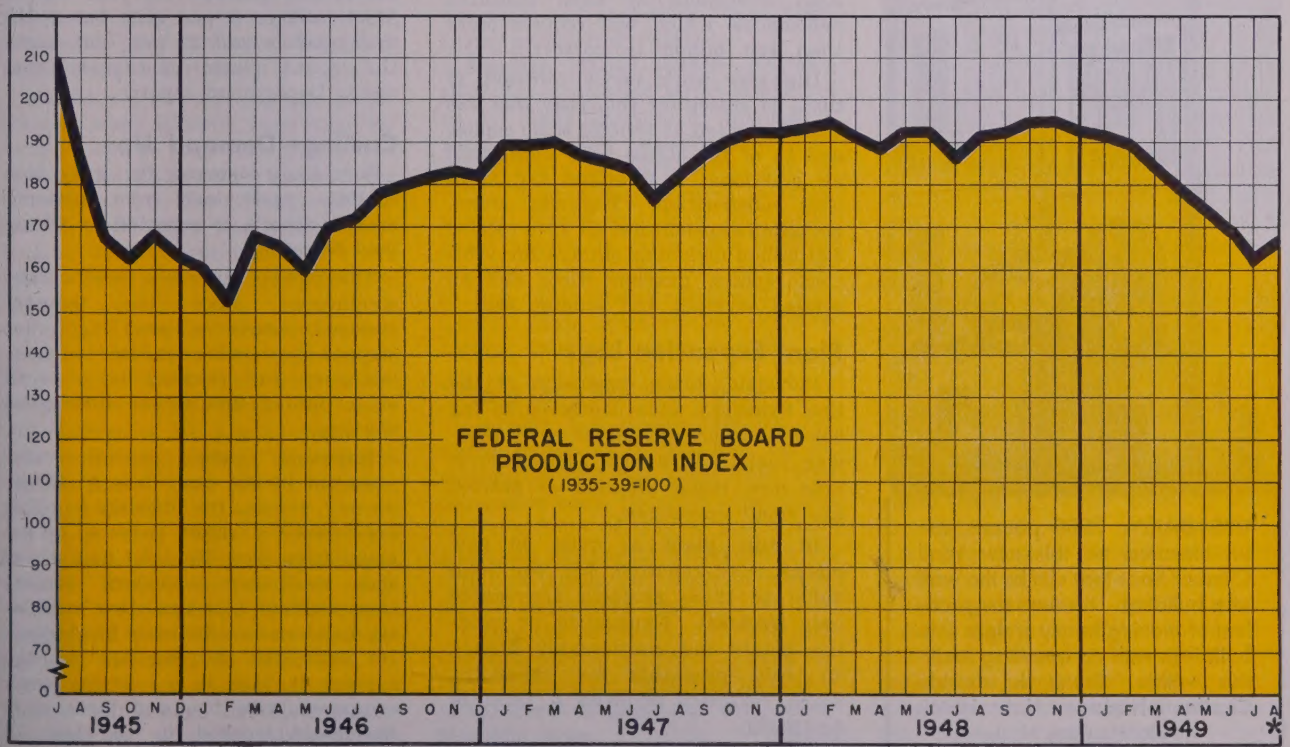
The accompanying chart shows that the Federal Reserve board's seasonally adjusted production index rose in August for the first break in a steady decline from November, 1948. How far this index can rise during the third phase is anybody's guess, but economic specialists say that the peaks of the postwar boom are not necessarily the ceiling.

These third phase possibilities would be ruled out in case of war, widespread strikes or severe government restrictions. Strikes, government interference or a combination of both appear to be the most likely factors which could upset all predictions.

First Phase—The immediate boom phase lasted from the end of the war until about August, 1948. It was characterized by: Reconversion of industry, plant expansion, capacity production, shortages, inflation, rising wages, swollen production costs resulting from overtime and inefficient practices, heavy order backlogs, many new businesses, sellers' or gray markets.

The shakeout phase probably began in September, 1948, when the Bureau of Labor Statistics' index of wholesale prices turned down. This stage has been characterized by: Disappearance of acute shortages and gray markets, increased price and quality consciousness, reduced inventories, industrial expansion programs curtailed or postponed, declines in production and employment, downward prices, return of buyers' market.

Shakeout Continues—The adjustment is not yet complete. Further price cuts are coming. The auto industry has not yet caught up with demand. Reduced raw material prices have not yet been fully reflected in lower prices of finished



*Estimated.

goods. Industry is not yet adjusted to the buyers' market.

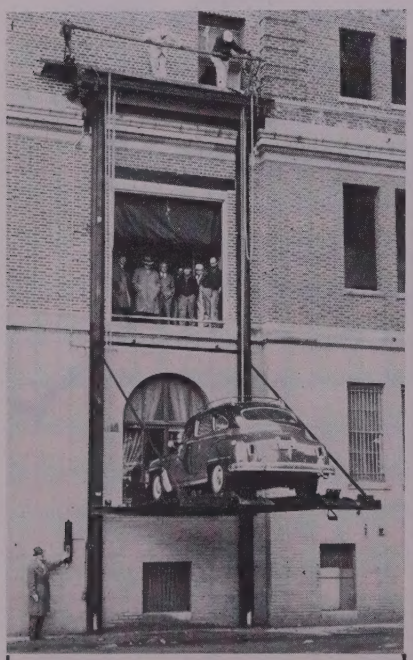
The current situation is much different from the 1920-21 deflation. Then almost all industries, including farm production, caught up with demand at the same time. Now we are getting the shocks much more gradually. This time no big security or real estate speculations will be deflated. Farm prices are pegged, existing wage scales assured, unemployed protected by social security benefits.

August Employment Jumps

Employment showed a sizable boost from July to August while unemployment fell considerably, government officials say.

The August report places employment at 59,947,000, nearest the 60 million target for any time this year. Unemployment is well down from the 4 million mark, to 3,689,000. July employment is estimated at 59,720,000; unemployment is estimated at 4,095,000.

Secretary of Labor Maurice Tobin, in particular, has expressed confidence. He predicts 1 million new jobs by January, 1950. A Labor Department aide said "employment rise is a good deal more than seasonal." An unemployment decline is normal from July to August.



UPSADAISY: 7000 pounds can be elevated on this new Wall Climber hoist that climbs the wall of a building. It solves the problem of moving heavy freight into buildings with no handling facilities within. Scene is outside Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.

Business Turning Up

The business curve has reached bottom and is turned up, National Association of Purchasing Agents concludes from its August survey reports.

Production and new orders both have increased. Industrial price trends stabilized in August. Purchased inventories continue to be reduced. Except for stockpile buying in anticipation of coal and steel labor difficulties, industrial inventories for August would be lower than in July. Employment has increased, though not in proportion to the production gain. Buying policy, which has been predominantly on a "hand-to-mouth to 30-day" basis, shows a slight swing toward the 60-day position.

The consensus of purchasing executives on future manufacturing activities is that only short-term programs may be developed while major labor costs remain unsettled.

Road Work Backlog Large

Backlog of "neglected" road repair and construction which totals $20.7 billion provides "an unmeasured market for business and industry." says Sen. Joseph C. O'Mahoney (Dem., Wyo.), chairman of the joint congressional economic committee. Of the 40 states which have replied to the committee's query as to their road conditions, 34 have indicated deficiencies which will require more than $20 billion to correct.

Highway work under contract in these 34 states for this year was less than $1 billion at time of their replies and 31 of the states have authorized an additional $1.2 billion for highway construction. Highway transportation expenditures in 1948 totaled $30 billion including outlays for vehicles, repairs, gasoline, tires and all related services, the senator said.

Plant Expansion Lags

Industrial plant expansion in the San Francisco area continues to lag below the pace set in the early postwar years. Most new factory projects now being planned or started are small operations.

In July plans to build 16 new plants were reported, but the total value of these projects aggregated only $336,000. Expansions of existing plants ran considerably higher. In July proposals for expanding seven factories involved a total of $4,329,000.

During the first seven months this year, plans for 152 new plants in the San Francisco bay area were announced, at a total outlay of $8,704,100, and expansions of 113 plants involved $14,156,940.

Sawyer Visits West

Secretary of Commerce Charles Sawyer left Washington Sept. 10 to make a study of employment and economic conditions in seven western cities.

He will confer with businessmen, labor leaders and public officials in San Diego, Calif.; Los Angeles; San Francisco; Portland, Oreg.; Seattle; Salt Lake City; and Denver. Secretary Sawyer has previously surveyed economic conditions in nine other cities.

Midwest To Woo Industry

Strong promotional campaigns on behalf of regional areas to woo new industry is hurting the Midwest, commerce association officials believe.

Midwesterners have started research and conferences to determine whether Wisconsin, Illinois, Indiana, Ohio and Michigan should organize for "defensive counteraction." At a preliminary meeting in Chicago representatives from the five states drew up a tentative promotional program based on the area's abundance of fresh water, marketing potential and dense population.

Plumbing Shipments Fall

Shipments of plumbing fixtures in the second quarter this year totaled $46.6 million, 3 per cent below the first quarter and 23 per cent under the second quarter last year, Commerce Department reports.

Castings Demand Up

Increasing demand for gray iron castings, particularly from appliance manufacturers, is reported by Cleveland foundries.

The pickup in orders, first of any significance since the industry slumped nearly a year ago, has stepped up working schedules in some instances and resulted in a recall of a limited number of furloughed workers.

Raymond Collier, executive vice president of the Gray Iron Founders Society, reports the industry has also experienced a slight increase in demand from New England textile and shoe machinery producers. Orders from machine tool and other machinery builders have likewise brightened. He estimates the industry on the average is back to a four-day week compared with two and three days frequently worked in the last 10 months.

Closing Plans Ready

Producers blueprint plant shutdowns in event of strike. Union heads meet in Pittsburgh

WHILE steel producers hope (and many expect) that a steel strike may be averted, blueprints for the orderly closing down of facilities have been readied. Should no agreement be reached between union and management and should the Sept. 14 deadline not be extended, coke ovens will start cooling Tuesday, to be followed by blast furnaces and other facilities in natural order.

Executive and wage-policy committees of the United Steelworkers will meet in Pittsburgh Sept. 12 to digest the report of the President's fact-finding board in the steel wage dispute, and plan the next steps in their campaign to force a fourth-round wage increase.

In steel company offices in Pittsburgh, Chicago, Cleveland, Youngstown and other steelmaking centers, management officials stood prepared to resist any increases of the dimensions asked by the union. The union is seeking a package increase which it estimates will cost 30 cents an hour, but which steel companies say would cost much more.

At week-end, the consensus was that a compromise settlement was at least a 50-50 bet. Steel producers are believed willing to grant a small wage increase—but not much. Before granting increases that would necessitate price advances, they probably will risk a strike.

Should a strike develop out of the current wage dispute, steel men believe it will be long and bitter.

Platform, Radio and Press—As the showdown on the wage dispute neared, both union and management took to the platform, microphone and newspapers to air their sides of the dispute.

Philip Murray, steel union president, in a Labor Day address at Pittsburgh reviewed the union's arguments for wage increases, pensions and insurance. He argued wage increases were necessary "to replenish buying power" and "avert a man-made recession."

At Cleveland, radio time was used by T. F. Patton, vice president and counsel, Republic Steel Corp., and William Donovan of the United Steelworkers to bring the cases of management and labor to the public.

Newspaper ads sponsored by companies, civic groups and other manufacturers, not directly related to the steel dispute but sure to be affected should a steel strike occur, argued against a walkout.

Administration Noncommittal — Members of the national administration, which until a couple of months ago was busy fighting inflation, avoided the wage issue. President Truman, Secretary of Labor Tobin and other Labor Day speakers contented themselves with condemning the Taft-Hartley Act and promising its repeal, congratulating labor on its gains, and promising future benefits of an indefinite nature.

Sanction Strike—Union preparations for a possible strike continued to be made quietly. In Minnesota, where state law requires a vote by the workers before a strike can be called, United Steelworkers in fabricating plants and iron ore mines voted heavily in favor of a walkout if union demands are not met. Laws in five other states, Michigan, Wisconsin, Utah, Missouri and Florida, require balloting before a strike.

"Now Let's Kill the Goose"

Likening the union's demands for fourth-round wage increases to an attempt to kill the goose that lays the golden eggs, Republic Steel Corp. laid the facts of wages, profits and plant and equipment maintenance before the public last week in metropolitan newspaper ads.

Citing the thousands of dollars that are necessary to provide the tools for each steelworker, and the increases in the costs of plant and equipment, Republic says:

"You can't have a good job without a good place to work and good tools and equipment to use.

"These working facilities must be kept up to date. This costs tremendous amounts of money. Profits are needed to supply this money.

"The ability of a company like Republic to make enough profit to provide adequate reserves for these needs is vital to the continued operation of the business and the welfare of every employee."

May Ford Strike Losses Publicized

THE 23-day strike at Ford Motor Co. last May cost the nation $243,000,000. These losses never will be regained.

This is the theme of full-page advertisements published in Detroit newspapers while Walter Reuther, CIO auto workers president, threatens a new walkout at Ford plants. The ads are sponsored by the Detroit Board of Commerce.

The board urges that strike costs be computed in advance of shutdown. The purpose of publicizing the costs of last May shutdown, says the board, is to help the parties concerned come to terms without another strike.

"Another Ford strike, at this time, would threaten the economic stability of the nation. It would grab take-home pay out of the workers' hands—make it tough to buy food and clothing for the family.

"The strike would stagger the company's progress—choke dealer operations—close suppliers' plants across the country—hit hard at merchants and professions—deprive local, state and federal governments of tax revenue.

"The right to strike is undisputed—but the duty to negotiate settlements peacefully is equally American. Strikes always end up at a conference table, anyway. And when you count the costs inflicted, it is absolutely shocking.

"How much better it would be to compute the costs in advance—the net cost to everyone—before the suffering caused by strikes is actually experienced."

Wage Concessions Small

Wage settlements in Cleveland to date in 1949 have resulted in average increases of slightly more than 2 cents an hour.

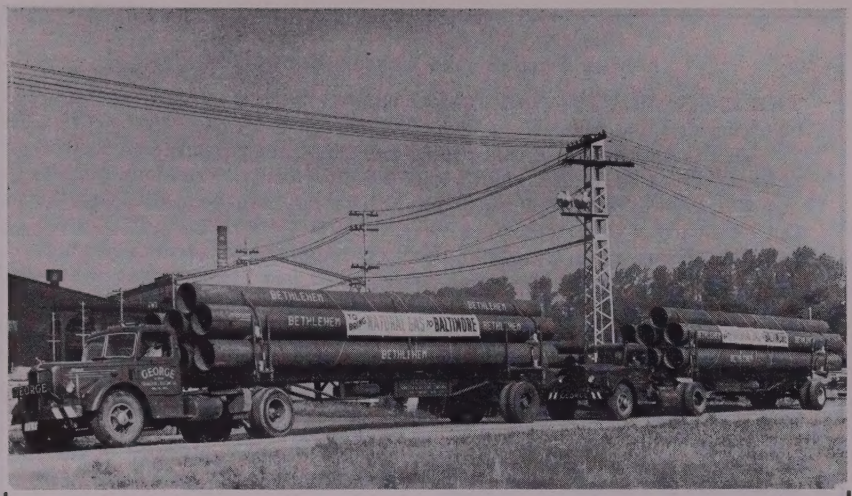
Of 116 agreements signed, 50 provide for no increase and only eight provide for advances of more than 5 cents an hour, according to Associated Industries of Cleveland.

A large number of agreements provide for reopening should a new wage pattern develop.

July Steel Shipments Lag

NET shipments of steel products in July totaled 4,534,855 net tons, compared with 5,177,259 tons in June and 5,229,880 tons in July, 1948, American Iron & Steel Institute reports.

Net shipments for the first seven months this year amount to 38,164,012 tons, compared with 37,485,813 tons in the same 1948 period. Cold-rolled sheets accounted for the largest tonnage shipments in July, 625,775.



GAS FOR BALTIMORE: Trucks carrying 26-inch electric fusion welded gas pipe leave the Steelton plant of Bethlehem Steel Co. enroute to Baltimore. More than 15 miles of pipe will be laid from Granite, Md., to Spring Garden central distribution station of Consolidated Gas & Electric Light & Power Co., Baltimore, to bring natural gas from the trunk line passing through Granite into the city. More than 200 truckloads will be needed to haul the 3065 tons of ¼-inch steel plate rolled by Bethlehem at its Sparrows Point, Md., plant

Truck Loads Limited

Haulers of iron and steel agree upon maximum weights that may be carried safely

LOAD LIMITATIONS are now set up for trucks hauling iron and steel products in Official Territory.

The limits were agreed upon by representatives of motor carriers at a meeting under auspices of the Interstate Commerce Commission, Washington, in a move to increase safety of the public and truck drivers. Effectiveness of the limitations is promised by statements of major steel companies that they will refuse to load trucks beyond the agreed limits, says the ICC, which adds that a similar policy is expected to be followed by all members of the American Iron & Steel Institute.

Maximum pay load capacity of each motor vehicle used to transport iron and steel in Official Territory must be painted on the vehicle before Nov. 1, or it will not be loaded by steel companies. The marking will represent the greatest load which may be transported safely. This maximum capacity is to be determined by a formula based on the size of tires used on the vehicle. However, the tire size must not exceed the maximum recommended by the manufacturer of the vehicle.

The new agreement requires also that before Jan. 1, 1950, each truck carrying iron or steel be equipped with adequate means for fastening down loads and with bulkheads to prevent loads from sliding beyond the front edge of a truck or semitrailer bed.

Maximum capacities under the agreement are not to supersede weight laws of any state. They are intended to relate only to the possibility of safe operation of vehicles

Truck Freight Volume Rises

Volume of freight hauled by intercity Class 1 motor carriers increased 1.9 per cent in the second quarter this year over the like period of 1948. But there were continued signs of a leveling off in tonnage.

Freight transported by 1345 Class 1 carriers in the second quarter of 1949 totaled 30,458,582 tons, compared with 29,884,398 tons in the corresponding period of last year, says American Trucking Associations Inc., Washington. The gain stemmed directly from an increase in movement of special commodities, particularly automobiles. Tonnage hauled by carriers of general freight declined 1.7 per cent under the 1948 second quarter.

Five of nine geographical regions showed an overall decrease in tonnage, with the drops ranging from 0.5 per cent in the Middle Atlantic region to 11 per cent in New England.

Alcoa To Build New Plant

SOUTHERN PRODUCTION Co. Inc., Shreveport, La., and Alcoa Mining Co., subsidiary of Aluminum Co. of America, Pittsburgh, have signed a contract to further develop Southern Production's Magnolia Beach and Melbourn fields in Calhoun county, Texas. Aluminum Co. is building a new plant near these properties and will drill a minimum of five wells on the land. Gas accruing to Aluminum Co. will be used for fuel in its new plant.

Manufacturers' Agents

Handle more than $1 billion in metalworking sales, more than double prewar volume

METALWORKING industry is turning increasingly to manufacturers' agents to help boost sales efforts.

About 3500 agents handled metalworking products in 1939 and did $490 million worth of business. Over 3500 agents exist now, and their volume is estimated at well over $1 billion annually. Manufacturers' Agents National Association, Los Angeles, reports that agents are particularly active in the machine tool and machinery fields. Other metalworking products handled include automotive, electrical, farm, hardware, jewelry, plumbing, heating and metals. Items handled now which weren't carried to any significant extent before the war include lapidary machinery, farm equipment, materials handling apparatus and electronic equipment.

High costs of selling have favored the manufacturers' agent who represents chiefly small and medium size producers. Most large firms deal through some agents in areas where they do not consider it profitable to establish a branch office. Other factors influencing the trend toward agents are: War, manufacturers' caution and taxes.

War's dislocations broke up many private sales organizations. After the war it often cost too much to rebuild them.

Uncertainty in economic conditions since end of the war has led many producers to contact an agent rather than build a private sales force because in a recession it is cheaper to carry an agent. If he sells nothing, he is paid nothing. A small manufacturer favors the agent for at least the first stage of sales penetration in a new area. Complex taxes alarm many small and medium sized companies.

They are glad to let the independent agent wrestle with them. Furthermore, in California and Texas unfriendly tax regulations regarding foreign corporations prompt even large companies to prefer independent manufacturers' agents to a private sales force.

Mill Pricing Hits Pittsburgh

Increased freight rates place nation's largest steel producing center at disadvantage with other districts. Metalworking companies, paying freight, buy nearer home

MILL PRICING of steel is being blamed for the relatively poor rate of steel production in the Pittsburgh district, the nation's biggest from standpoint of capacity.

Going into a decline last March when overall steel demand eased, the district since has consistently made a poorer showing than other major producing areas. Its plight is depicted by a comparison in the accompanying chart with operations in the Chicago district which is second in capacity only to the Pittsburgh district.

Those blaming the pricing situation reason that when metalworking companies could be somewhat selective in buying steel they began to confine their orders to the closest mills to hold freight costs as low as possible. Because the Pittsburgh district consumes a smaller proportion of its steel production than some of the other districts, Chicago for instance, the move to buy steel as close to home as possible has been particularly constrictive on Pittsburgh, say analysts.

Disadvantage of Pittsburgh has been accentuated, they point out, by increases in freight rates of more than 100 per cent since 1938 in some instances. Today's rail carload rate on steel shipments from Pittsburgh to Detroit is 51 cents per 100 pounds, in contrast with 29 cents in 1938; similarly the comparison from Pittsburgh to New York is 60 cents, compared with 36 cents in 1938.

Use Trucks, Barges — To escape some of the disadvantages of increased rail freight rates, producers and consumers have been utilizing truck and barge transportation increasingly. One steel producer, for example, has increased tonnage shipped by barge more than 50 per cent over prewar days. Similarly, truck shipments of steel have expanded sharply. Leading interests decline to divulge the extent. This upward trend in river and highway movement of steel has leveled off, however, because of the limited supply of barges and trucks, plus insufficient dock facilities.

Blame for Pittsburgh's relatively low steel production rate is not being placed solely on freight disadvantages. Other factors cited are: 1. Product mix that is dominated with products now in relatively light demand; and 2. relatively large proportion of old, high-cost melting and rolling facilities.

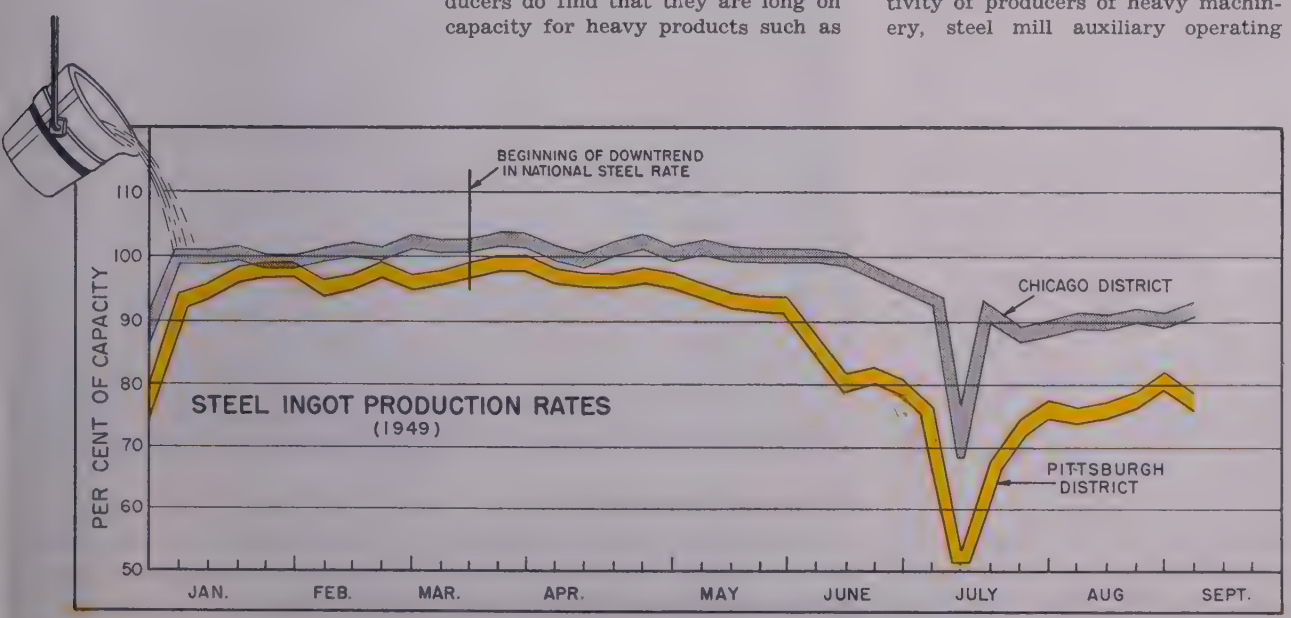
The subject of product mix among Pittsburgh mills has been under constant study to adapt it to the long-range pattern of customer requirements. Pittsburgh steel producers realize they have not shared proportionately in the industry's expansion of flat-rolled thin gage steel production facilities, the main part of the expansion being at mills near major consuming areas. Pittsburgh producers do find that they are long on capacity for heavy products such as rails, shapes, plates, and tubular goods. They also have a considerable capacity for railroad specialties, tool steels, and stainless and other alloy steels. With exception of tubular goods these products have been less in demand than the major flat-rolled thin gage products since early in the year.

Conversion Demand Fades — Also cited as a reason for Pittsburgh's predicament is collapse of demand for ingots and other semifinished steel for conversion into sheets and pipe by nonintegrated mills.

Old, high-cost facilities became an increasingly dominant factor in the production downtrend when overall steel demand fell below supply. Those facilities were naturally among the first to be shut down. Operators of nearly all of these mills were forced to quote premium price differentials during the early postwar period.

Although mill pricing is being dealt much of the blame for Pittsburgh's current lag in operations the present relationship to Chicago's production pace is quite similar to that in the third quarter of 1938 and 1939. In the first ten weeks of the third quarter of 1949 the Pittsburgh rate has been 7½ to 22½ percentage points below Chicago's. In the third quarter of 1938 Pittsburgh's rate was 3½ to 9 points below Chicago's. In all but four weeks of the third quarter of 1939 the Pittsburgh rate was below the Chicago level, the Pittsburgh deficiency ranging from 2 to 8½ points.

To strengthen its position, the Pittsburgh district is working strenuously to induce additional metal consuming plants, particularly stampers, to locate there near a steel source and cut freight costs. The district still is primarily dependent on activity of producers of heavy machinery, steel mill auxiliary operating



equipment, railroad products, tanks and barges, and fasteners.

Freight Absorption

Will be restricted if Carroll amendments are included in O'Mahoney bill

HOPE for a legislative green light on absorption of freight is dimming.

The O'Mahoney bill which promised to permit at least some measure of absorption and help clarify the pricing situation appears to be facing restrictive amendments insisted upon by Rep. John A. Carroll (Colo.). On the basis of the current outlook that the Carroll amendments will be in the final bill, STEEL asked a number of top government attorneys for their opinions as to how such legislation would affect the steel and metalworking industries. Their answers boil down thusly: If the bill is enacted with the Carroll amendments, steel companies will want to proceed cautiously in modifying the present f.o.b. mill selling policy; certainly, the Carroll amendments will not permit the steel industry to return to its former multiple-basing-point, delivered-price system.

Permission Qualified — The first Carroll amendment, they point out, qualifies the right to absorb freight "to meet the equally low price of a competitor in good faith" with words "except where such absorption of freight would be such that its effect upon competition may be that prohibited by this section." And the second Carroll amendment provides that a seller may justify a discrimination "if the discrimination is not such that its effect upon competition may be that prohibited by this section." The sections referred to are 2 (a) and 2 (b) of the Robinson-Patman Act.

The comments heard from government attorneys vary in tenor; some think the freight absorption bill, with the Carroll amendments, is desirable because of its value in assuring that delivered pricing, under certain conditions, is legal. Others go so far as to take the view that the right to absorb freight would be useless in view of the limiting factors.

Says one: "The bill with the Carroll amendments would make clear the intent of Congress that nothing in the law should be taken to prohibit freight absorption when carried on independently by a single seller and without collusion and without discriminations that might injure competition."

Says another: "The bill with the Carroll amendments is definitely the equivalent of the Wheeler antibasing point bill which would have made f.o.b. selling the only legal method."

Says a third: "The effect of the Carroll amendments would be to eliminate, or make much more difficult, the defense that acts of freight absorption or price discrimination were undertaken in good faith to meet competition."

Says a fourth: "Industry says it wants to use freight absorption to promote competition—not to injure competition. The Carroll amendments do not seem to me to be inconsistent with the position of industrialists who want to engage in freight absorption. But if they say one thing and want another, the Carroll amendments would be very embarrassing—because that is what the Carroll amendments would prevent."

Says a fifth: "Steel company managers who think they would rather have the bill with the Carroll amendments than no bill at all have not studied the bill with the Carroll amendments and do not understand their effect. Clearly, these amendments give legal sanction to the Seventh Circuit Court decision in the Standard Oil case which said that good faith is not a defense. They would not disturb the government view that it is illegal to discriminate in price if competition is injured as a result. They would not prevent the government from holding, as it did in the rigid steel conduit case, that freight absorption may injure competition when done individually and in the absence of conspiracy. In my opinion, enactment of the freight absorption bill with the Carroll amendments would tend to replace existing uncertainties with the certainty that it is safer, in general, to sell f.o.b. than to take a chance on delivered pricing."

Conferences Delayed—No date has been set for a further meeting of the conferees. It will not be held until Sept. 21, the date set by the House for reconvening. It is more likely that it will not be held until two of the key House conferees, Reps. Walter and Case, return from Europe Oct. 17.

In the meantime, some of the Carroll amendment opponents in both houses are talking about launching a movement to kill the bill if presented from conference with the amendments, and seeking instead to get the Congress to enact the original Myers moratorium bill. Whether such a move could be successful remains to be seeen.

Rolling Mill for Austria

FINAL shipment of steel and aluminum rolling mill equipment, built by Lewis Foundry & Machine Division of Blaw-Knox Co., Pittsburgh, was made last week to the Austrian firm of Osterreichische Metallwerke Aktiengesellschaft for installation at Vienna.

The contract, approximating $1 million under ECA provisions, included: Two 2-high skin pass steel strip mills 22 by 50 inches; one single stand 4-high roughing mill for sheet and strip aluminum; and one 4-high mill for rolling aluminum foil. The four-high roughing mill 15 x 36 x 60 inches embodies the principles of a new 4-high single stand design recently introduced by Lewis Foundry & Machine Co. and at least in one instance used in this country for rolling stainless.

Republic Cuts at Massillon

REPUBLIC Steel Corp. closed down all iron and steelmaking operations at its Massillon, O., plant last week. About 1700 workers were laid off.

The suspension which will be for an indefinite period has been necessitated by a lack of orders for the alloy steel commonly produced in Massillon. The idled facilities include a blast furnace with an average daily capacity of 680 tons of pig iron, nine open-hearth furnaces, a blooming mill and a 24-inch billet mill.

Operations at Republic's Massillon plant have been sporadic since early spring when orders dropped sharply. Last month several open hearths were returned to production to meet the increased demand for alloy products. Fear of a strike apparently caused this spurt, Republic says. These orders have now been filled, and subsequent demand will be met by the Canton, O., plant for the present.

Operations of a 49-oven coke plant, the 18-inch and 12-inch bar mills and stainless steel finishing departments in Massillon will be continued as long as possible.

U.S. Steel Builds Low-Cost House

U. S. STEEL Corp.'s Gunnison Homes Inc. is entering the low-cost housing field with a prefabricated four-room home.

The dwelling, which has two bedrooms, will be produced at New Albany, Ind., where assembly lines can turn out one every 20 minutes. The unit, of plywood construction with the usual metal corollary equipment, is introduced to take advantage of the 95 per cent FHA mortgage insurance, where the appraised value of the home and lot does not exceed $6300. Gunnison will continue to market its medium and higher-priced larger homes.

Delays Irk Builders

Machine tool people see export business going to European firms as result of license delays

DELAYS in getting approval of export licenses are annoying machine tool builders. Builders contend they are losing business because of these delays. They become particularly unhappy when they find this business going to European firms which have been put back in business with American dollars.

Commerce Department officials explain they are not to blame for the machine tool builders' woes although the department has been the target for their criticism. Applications for export licenses to Western European destinations are seldom delayed, Commerce explains, and then only if the consignee is suspected of shady dealings, particularly transshipment to Eastern Europe.

Machine tool exports to Eastern Europe are another matter. Since those nations are all iron curtain countries, all items possessing "war potential" must be passed by an interdepartmental committee which includes representatives of State Department, National Military Establishment, Agriculture Department and Atomic Energy Commission as well as the Commerce Department.

Check Intended Use—Before the interdepartmental committee approves items for export, it often has the American consulate in the consignee's area check the purpose for which the machine tool is intended. In many instances versatility of American machine tools in which U. S. builders take pride gives them war potential even though customers say tools will be used for peaceful projects, Commerce explains.

Not only have they not been responsible for delays, say Commerce officials, but the department's regional offices have in many instances helped expedite licenses through the committee. When some members of the interdepartmental committee fail to realize the spot businessmen are in when their letters of credit near the expiration date, their license period is nearly up and they have had no word on their request, Commerce officials say they try to get action and a number of times have succeeded.

Others Sell to Russia—Many of the tool builders say that the program of refusing to send machine tools to Russia and its satellites is not working out because other nations are selling this equipment to Communist-dominated countries. They point out that delays in granting of licenses deter foreign business because the consignee is reluctant to place an order that may be subject to a delay or may fail to get approval.

Unless the other western nations co-operate, U. S. delays and refusals to grant licenses merely shrink a sorely needed foreign market.

SALES PROMOTER: Machine tools and small tools are displayed in adjacent sections of the Brown & Sharpe Mfg. Co.'s on-the-premises showroom in Providence, R. I. The sections are also used for personnel and public relations work

Machine Tool Exports Dip

Exports of U. S. machine tools aggregated $39,643,548 in the first half of 1949, compared with $40,498,762 in the corresponding period of last year and $72,068,549 in all of 1948.

Countries which took more American tools in the first half of 1949 than in the same period of 1948 were: Pakistan, Netherlands Indies, Australia, Egypt, Saudi Arabia, Palestine, Canada, Mexico, Venezuela, Bolivia, Chile, Brazil, Norway, Denmark, France, German Trizonia, Austria, Italy and Greece. Greatest gain was in shipments to Italy, Austria, Germany, Denmark, Norway, Saudi Arabia, Egypt and Palestine.

Biggest declines were in shipments to: Turkey, Union of South Africa, Argentina, Sweden, United Kingdom, Netherlands, Poland and Danzig, Czechoslovakia, Finland and Spain.

Shipments by countries of destination in the first six months of 1948 and 1949 were:

	First half 1948	First half 1949
India	$1,396,581	$1,217,837
Pakistan	2,923	267,369
Netherlands Indies	177,322	536,165
Philippines	167,575	105,559
China	493,565	436,106
Australia	559,555	681,732
Egypt	55,064	117,258
Saudi Arabia	79,988	237,575
Turkey	375,305	108,470
Palestine	54,642	123,244
Union of So. Africa	734,242	327,500
Canada	5,057,699	5,183,414
Mexico	860,522	897,536
Canal Zone	13,022	104,287
Cuba	272,280	246,773
Colombia	370,362	240,058
Venezuela	486,469	533,731
Bolivia	24,966	155,547
Chile	423,897	689,111
Brazil	1,256,177	1,309,284
Argentina	2,815,945	731,683
*Sweden	1,403,863	905,438
*Norway	144,559	755,099
*Denmark	138,728	716,760
*United Kingdom	5,391,538	3,888,726
*Netherlands	2,691,323	1,899,379
*Benelux	1,563,195	1,192,519
*France	4,260,274	5,572,356
*W. Germany	32,580	838,846
*Austria	214,166	1,958,115
Czechoslovakia	444,683	4,174
*Switzerland	1,674,057	1,579,999
Finland	237,779	104,142
Poland & Danzig	1,110,572	406,711
Spain	271,380	118,317
*Italy	752,583	3,973,888
*Greece	106,935	137,651
U.S.S.R.	1,963,523	.....
Totals	$40,498,762	$39,643,548

* E.C.A.

Unified Screw Thread Gains

DELEGATES from 15 of the 18 countries represented at the most recent meeting of the International Standardization Organization voted to recommend the Unified Anglo-American Screw Thread to their national standardization bodies as the common profile for the metric and inch systems of screw threads. Russian delegates cast the only negative vote. They came to the meeting instructed to vote for the Zurich 1939 profile which is somewhat similar to the Anglo-American thread.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Defense Department announces its plan for co-operating with the "spot assistance" program. Aid to business lies in procurement done by competitive bidding

DEPRESSED AREAS of the U. S. should not look to the President's "spot assistance" program to get them all the way out of the hole.

The only aid that can be furnished lies in placing government orders with companies that need new business to put idle employees back to work since there is no money available to pay for relief projects. The Defense Department has announced its plan for co-operating with the President's program for alleviating serious unemployment problems.

There is a limit to what can be done through procurement: It must be done under the law—by competitive bidding in most cases, through negotiation in the case of research and development work and in preparing companies for tasks they will do for industrial mobilization in event of war.

Under the program formulated at the direction of John R. Steelman, assistant to the President, 21 procurement agencies of the government have prepared or are preparing lists of their needs. Copies of these lists are made available to interested manufacturers in the 32 depressed areas through chambers of commerce, boards of trade or other business groups. The lists give a fund of advance information to be mulled over by those concerns needing business.

The Munitions Board is supervising preparation of lists of the three principal procurement agencies—Army, Navy and Air Force—and is going a step further: The board will prepare pilot studies of ailing industry in Muskegon, Mich., and New Bedford, Mass., to ascertain what the lagging plants in those areas can make for the military. There will be more of this sort of thing. Opportunities to get government business will be pointed out as definitely as possible. After that, the companies concerned will have to sharpen their pencils and quote prices that will stand up in competition.

To date, two companies in depressed areas have obtained contracts under the spot assistance program. Two textile companies in Tennessee have obtained contracts for mailbags for the Post Office Department. Normally these contracts would have gone to two northern mills that are specialists in making mailbags. Through being deprived of these contracts, the two northern mills are faced with serious gaps in their manufacturing schedules.

U.S. Barters for Aluminum Stocks

REPORTS are premature that Reynolds Metals Co. is dickering for purchase of four government alumina and aluminum plants in a barter deal similar to that negotiated by Henry Kaiser's Permanente Metals Corp. Permanente will make part payment for its plants by delivering aluminum to the Munitions Board's stockpile.

Although the General Services Administration expects Reynolds to take possession of the plants under such a deal, no negotiations are yet under way. Plants involved are at Hurricane Creek, Ark.; Jones Mill, Ark.; Troutdale, Oreg.; and McCook, Ill. These facilities cost the government about $130 million and probably would be sold to Reynolds for about $60 million. Reynolds could make a $3 million down payment and a first installment payment of $2,371,200 by transferring about 33,570,000 lb of aluminum at regular market price for stockpiling.

Since the Munitions Board has informed GSA that it will accept 60 million pounds of aluminum this year for stockpiling under barter deals, the Permanente and Reynolds quotas would take all but about 2.5 million pounds of this target. Because Aluminum Co. of America paid cash for its plants, it is not able to negotiate a barter deal. While willing to accept aluminum under the barter statute, the government is not buying the metal for stockpiling. Hence the outlook is that with renewal of barter arrangements from year to year and assuming Reynolds will enter such an arrangement, the overwhelming portion of the government's stockpile of aluminum over the next 25 years will be supplied by Permanente and Reynolds.

BEFORE DOLLAR DICKER: Ernest Bevin arrives at 10 Downing Street to get final briefing by the British cabinet before he left for "dollar" talks in Washington last week. NEA Photo

Officers Study Mobilization

INDUSTRIAL College of the Armed Forces, according to Maj. Gen. Arthur W. Vanaman, USAF, commandant, has enrolled a class of 121 Army, Navy, Air Force and Marine Corps officers who will study the factors involved in mobilizing the economy of the country for emergencies. Dr. M. S. Reichley, instruction director, says emphasis again will be on industrial mobilization.

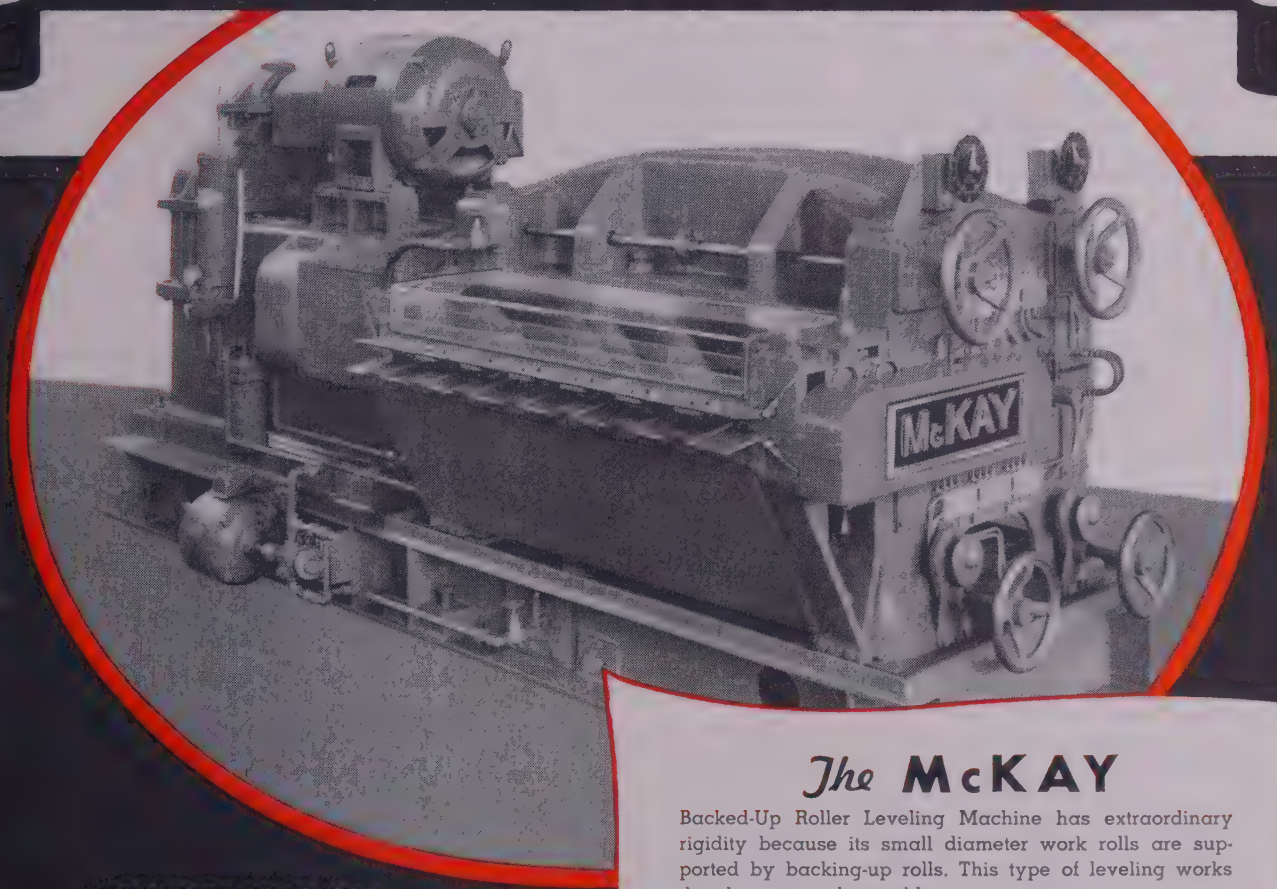
Air Force Shoos Industry Inland

GET AWAY from the coasts, the U. S. Air Force is telling the airplane industry. Disperse and move inland to areas less vulnerable to air attack.

The Air Force is taking this precautionary step because of the stake it has in the security of its source of craft, the airplane industry. Coming from the Air Force—the airplane industry's biggest customer—the request packs a lot of weight. To help make sure that its request will be heeded, the Air Force is awarding contracts with a stipulation as to

McKAY

BACKED-UP ROLLER LEVELERS



The McKAY

Backed-Up Roller Leveling Machine has extraordinary rigidity because its small diameter work rolls are supported by backing-up rolls. This type of leveling works the sheet more thoroughly.

Sheets processed on this type of leveler are strain relieved to a greater extent and have far superior stamping and drawing qualities than those processed by the ordinary leveler.

STANDARD FEATURES

ompact design reduces required oor space.

ll adjustments are readily ac- essible to the operator.

ccurate indicating dials are rovided for the screw downs.

lloy steel helical gears are used throughout—all gears fully enclosed and running in oil.

Drive is through improved type McKay universal couplings.

Rugged construction insures continuous performance and low maintenance.

OPTIONAL FEATURES

ne shot lubrication system.

ushing rolls for cleaning strip with built-in reservoir and ray system for solvent.

Entry or exit pinch rolls.

Sheet oiling system (on exit side of machine) with integral tank and oil distributing head.

The McKAY MACHINE Company
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO
ASSOCIATED COMPANY The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

ERFORMANCE · RUGGEDNESS · PRECISION AND SAFETY

where planes are to be built. In a contract with Boeing Aircraft Co. for the new high speed B-47 jet bomber the Air Force reached a "firm understanding" with the company that the planes are to be built at Boeing's Wichita, Kans., plant, and not at the Boeing Seattle plant. Essence of this is that government purchasing policy will be the prime factor in determining location of the nation's airplane production plants.

If successful, the Air Force's drive would complete an away-from-the-coast trend started by the airplane industry during the war. Prior to the war, airplane manufacture was concentrated on the east and west coasts.

To implement the Air Force's drive, Air Secretary W. Stuart Symington and some of his aides went to Seattle last week to talk with Boeing officials.

Moving is no easy task even though the companies may be willing to make the shift. Plant space and labor availability are two of the biggest obstacles. Boeing's Seattle plant has 4,275,000 sq ft, and the Wichita plant where the Air Force wants Boeing to center production provides only 2.5 million sq ft. About 25,000 employees are on the Seattle plant's payrolls, about 10,000 on the Wichita plant's. Contention is that a mass move to the Kansas town might seriously overtax the labor market while adding tremendously to housing problems. Meanwhile, coastal cities in danger of losing aircraft plants are exerting pressure to keep them.

U.S.—Argentine Talks Held Up

U. S.-ARGENTINE talks to encourage revival of business between the two countries have been further delayed because of the recent political upheaval in Argentina. Some formerly high Argentinian officials were thrown out of office. The recently created Joint United States-Argentine Committee for Commercial Studies cannot begin its work until some new Argentine members are appointed.

Brazil, Too, Has Dollar Trouble

ROLLED STEEL products, sheets, plates, tubular goods, small shapes and wire products no longer may be bought by Brazil in the U. S. because of a dollar shortage.

A substantial buyer of such products in the past, Brazil is tightening up also on machine tools. They may be imported under license. U. S. government officials tried to prevent the restrictive policy. The Export-Import Bank offered to make a dollar loan to Brazil. The Brazilians decided to work out their problem without such a loan.

Now preparations are underway to discuss with the Brazilians certain changes in their positive list of commodities which may be imported from the U. S. and other hard currency countries. Idea of such talks is to divert money earmarked for American textile machinery and other goods not available at this time to the purchase of such goods as rolled steel for which there has been a regular market in Brazil.

Bill To Plug Loophole

BILL to close a Clayton Act loophole by outlawing acquisition of the physical assets of a competitor to reduce competition will come to public hearings "within a few weeks," says Senator Herbert R. O'Conor (Dem. Md.), who is chairman of the Senate Judiciary subcommittee which will consider the measure. The bill already has passed the House and would amend the provision which now forbids only the acquisition of stock of a competitive company.

By Popular Demand

BEFORE he took time out from his congressional toil, Rep. Charles A. Plumley (by request) dropped a bill into the hopper. It came out labeled H.R. 6135, the "Prosperity Revenue Act."

It is a bill "To provide equitable assessment of taxes; to provide adequate social security for all American citizens; to solve the labor problem completely; to untax business and thus encourage full and efficient production and full employment; to cut the hidden sales taxes out of prices to reduce the high cost of living; to collect enough revenue to support the government, reduce the national debt and in due course revalue the dollar; to make the tax rate automatically adjustable to stabilize our economy on a rising standard of living; and for other purposes."

In it he defines "Price: The amount of money some of us will take for an item of goods or services (work done), and others of us are willing and able to pay for it; Life: The personal and primary capital asset, more valuable than money; Ownership: The essence of freedom; the exclusive rights and responsibilities of possession which derive from investment of capital assets."

Small Business Gets Army Dollars

ADHERING to a declared congressional policy that a fair proportion of its purchases shall be placed with small business, Army Department says it spent about 42 per cent of its procurement dollars with small business firms in fiscal 1949.

Figures compiled by Army's Logistics Division show that the Army spent almost $2 billion in continental United States. Small business concerns—defined by Congress to be those which employ fewer than 500, are independently owned and operated and not dominant in their field—got about $846,000.

More Awards for Grain Bins

COMMODITY CREDIT Corp. reports additional contract awards for bin-type and comparable storage structures of aluminum:

Cowin & Co. Inc., Minneapolis, 40; and Butler Mfg. Co., Kansas City, Mo., 2850.

Of steel:

K. M. Bishop, Carlisle, Iowa, 100; Builders Distributing Co., Cleveland, 1000; Luria Engineering Co., Washington, 10; Kilby Steel Co., Anniston, Ala., 1000; Monroe Auto Equipment Co., Monroe, Mich., 1500; Butler Mfg. Co., Kansas City, 3000; and Parkersburg Rig & Reel Co., Parkersburg, W. Va., 50.

These awards and others for wood and "Cemesto" bring the number of structures to 50,405. CCC officials say the awards and others now being processed will bring the current CCC storage procurement to a capacity of about 260 million bushels. When added to the 45 million bushels now in storage, total capacity will be about 300 million bushels.

Prospects for a near-record 1949 corn crop and an 800 million bushel carryover of old corn point to possibility of further storage problems next season.

NSRB Studies Troopship Needs

NATIONAL Security Resources Board is studying possible requirements for troopships in event of an emergency. So far, the survey is confined to potential shipping needs in relation to vessels extant.

Europe Pinched by U. S. Purse Strings

ERP nations concerned about Congress' failure to pass ECA allotments for fiscal 1949-50. House, Senate conferring to settle differences in appropriation measures

WESTERN EUROPE expects a bad pinch when the U. S. tightens its purse strings.

Aside from the British crisis, Europe is concerned about Congress' failure to pass ECA allotments for fiscal 1949-50 which began July 1. The House and Senate are still in conference to iron out differences in the two versions of the appropriations measure. Both bills call for much less than the $5.2 billion authorized for fiscal 1948-49. The Senate would allocate $3,776,500,000. Organization for European Economic Cooperation, using this tentative figure, recommends the sum be distributed as follows (in millions of dollars): Austria 174.1, Belgium-Luxemburg and territories 312.5, Denmark 91, Trieste 14, France and territories 704, Trizonal Germany 348.2, Greece 163.5, Iceland 7.3, Ireland 47, Italy 407, Netherlands and Indies 309.2, Norway 94, Portugal 33, Sweden 48, Turkey 61.7, United Kingdom 962.

ECA wishes the amounts for the individual countries cut by $150 million to establish a fund to promote rapid reduction of trade and payments barriers among the participating countries, encourage further development of overseas territories and finance investment projects in Western Europe of special international significance. OEEC's recommendations will be followed, subject to the change for a special fund and provided Congress decides on about the total sum the Senate has approved.

Foreign trade remains the major interest of European industry and government. Exports of British iron and steel are running at the highest rate since 1920. France has put into effect a new import system designed to save dollars. Western Germany is boosting overseas business efforts.

U. K. Steel Exports Climb

British exports of iron and steel in July, at 241,200 net tons, were the highest in 29 years despite the London dock strike in that month. Rate for the rest of the year may exceed 1920 levels. The dock strike, however, dislocated shipments of other products, chiefly electrical equipment.

Markets for U. K. steel are strongest in South America, Australia and the Middle East. South African demand has declined because of new import restrictions. The oil-rich Middle East is a valued market because it can pay in hard currency. For the last quarter, the government will increase allocations for the export of profitable structural shapes and bars.

In manufactured products, one of the liveliest markets is for freight cars. A newly formed export group of car builders has received orders for 500 cars valued at $5 million from New South Wales. Queensland has ordered 600 flat cars, and another Australian province, Victoria, has contracted for 500.

Britain's currency crisis has not yet forced general trade to decline, but many soft spots are appearing which may add up to reduce total trade. A powerful bloc of European nations, led by Belgium, seeks to force the U. K. to devalue its pound. Climax of the battle begins in Washington Sept. 13 when finance ministers gather for the annual meeting of the International Monetary Fund. Belgium, England's best continental customer, is threatening to cut off its trade with the U. K. or juggle official price relationships between the franc and sterling if Britain refuses a realistic currency. Combined European pressure could devalue the pound by force.

Trouble is also brewing in the Trade Union Congress, largest labor federation which began its annual meeting last Monday. Strong factions seek to break the wage freeze. Ruling body of the congress, the General Council, is supporting wage controls, but at last year's annual meeting it won support of the freeze policy by only a narrow margin.

France Plugs Dollar Drain

The new French import system is aimed at saving dollars. It tightens up the license procedure on nonessential items, plugs loopholes in the former law which permitted irregular practices and eliminates those provisions of the former law which tended to permit favoritism. ERP imports are not affected.

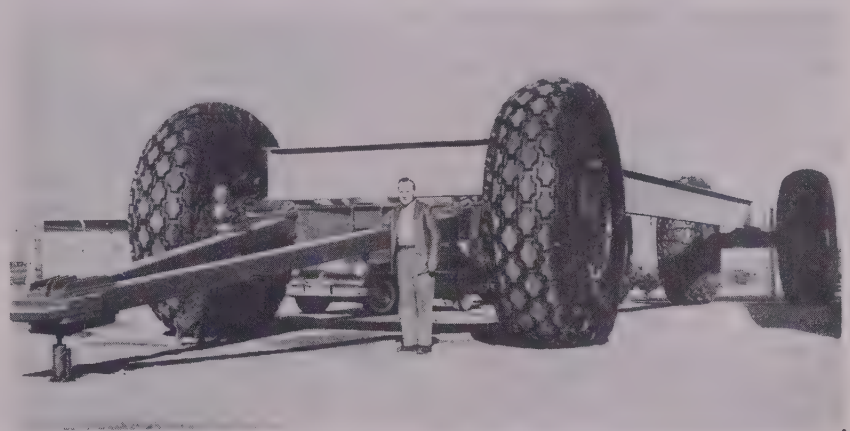
Bitter criticism of the new system has arisen on the grounds that red tape will be worse than ever, that free enterprise in overseas trade has received a crippling blow and that dollars may be saved, but only at a tremendous expense.

French automobile production continues at more than double the 1948 pace. Daily output is: Renault 300, Citroen 200, Sinca 95, Ford 40, Panhard 25.

Ruhr Builds Freight Cars

Western Germany's increasing overseas sales efforts have brought a $1.9 million freight car order from Australia's New South Wales. The Talbot Works at Aachen will build 500 cars for a government-owned railroad.

Nothing yet has been done about



BIG INFLATION: Dwarfing men and automobiles, these huge Firestone tires will be used to carry oil derricks from finished wells to new drilling locations in the oil fields of Arabia. Arabian American Oil Co. will lay derricks horizontally on axles of the giant dolly for towing across the desert instead of laboriously disassembling derricks. NEA Photo

reorganizing the German coal and steel industries along vertical lines. Action is expected now that Germany has elected a civil government and the Allies have replaced their military governors with civil officials. The new companies will be formed as private corporations, the shares of which will be given in exchange for the shares of the former companies. Most of the shares of the steel industry, with the exception of Krupp, are widely distributed.

The steel industry wishes to raise the price of bars from $63.75 per metric ton to $69.30 and structurals from $62.70 to $67.80. If government approval comes, the new quotations will become effective Oct. 1. High cost of imported ore is cited as the major reason for the increase. Total employment in the steel industry has reached 337,918, but many of these people are employed at repair and rehabilitation work rather than actual steel production.

Automobile output increased by 3.5 per cent to 14,053 units in August. Volkswagen accounted for most of the increase, with nearly 9000 units built in August for a postwar high.

"Remantling" German Plants

The Russians are stepping up steel production in the Soviet zone of Germany by putting dismantled rolling mills back on their former sites and by ordering the rebuilding of dismantled steel plants.

At war's end, the eastern zone had a steel capacity of 1.3 million tons. Of these about 1 million tons were dismantled. Some of the plants are now being re-equipped at top speed. Total production of rolled steel reached only 230,000 tons last year, but about 500,000 tons can be expected this year as a result of the "remantling."

Italy Rebuilds Steel Mills

Two projects for rebuilding Italian steel plants have been approved by ECA.

New investment on the projects may total $57 million, including more than $12 million in direct dollar aid, $12.9 million in counterpart funds and 12.9 billion lire in private capital. The plants to be rebuilt are at Bagnoli and Piombino in northern Italy. After completion, their total output in conjunction with modernized blast furnaces will top 1.4 million tons yearly.

The $12 million in direct ECA funds will be used to buy U. S. equipment for a blast furnace, a semicontinuous billet mill, a rod mill, semicontinuous hot strip mill, a blooming mill, an open-hearth furnace and soaking pits.

Can Output High

Electrolytic tin plating permits production boosts despite shortages and restrictions

COMMERCE Department's elimination of controls on tin use focuses attention on what industry—can and tin plate producers in this case—can do to combat shortages and expand operations in spite of restrictions.

Regulated since early in World War II, tin has been controlled longer and more stringently than any other major raw material used by the metalworking industry (for details on the few remaining tin controls see STEEL, Sept. 5, p. 56). Despite this situation, manufacturers of cans have boosted metal can production, largely because the development of electrolytic plating has permitted thinner coats of tin. The following figures — estimated for 1949 and prewar periods and supplied by the Commerce Department for other years — show metal can shipments expressed in tons of steel used.

1949	3,225,000	1939	1,825,000
1948	3,247,062	1937	1,950,000
1943	1,684,468	1929	1,475,000

Shortages a Factor — Wartime scarcities boomed the infant electrolytic process for making tin plate, and in eight years it has become the leading production method. In the initial half of this year, for the first time, more electrolytic was produced than hot-dip tin and terne plate. Electrolytic production in the first six months totaled 1,005,172 net tons, compared with hot-dip output of 900,349 tons. Accompanying chart shows the evolution in output.

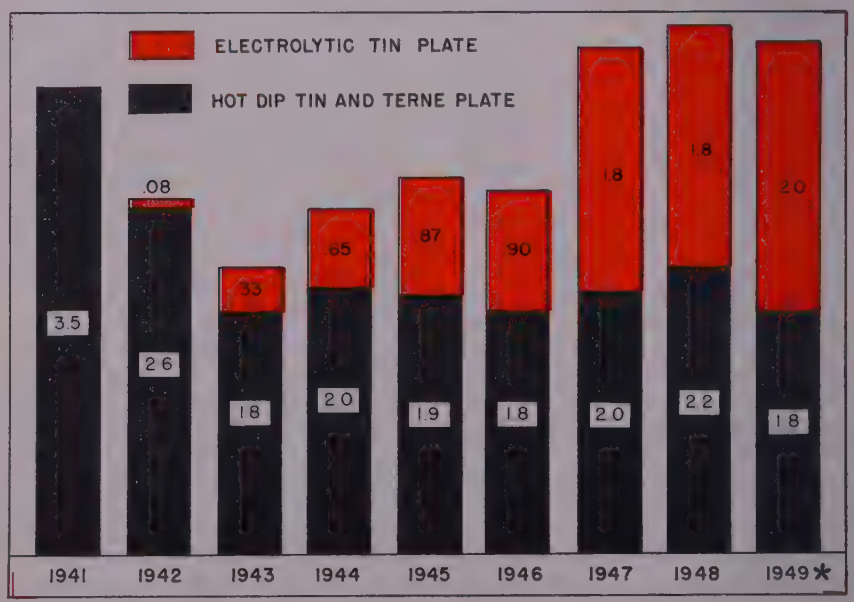
Continuing need for conservation, technological advances and lower costs explain the preference for electrolytic tin expressed by users, particularly canmakers who consume 85 per cent of total tin plate output. While 1.31 lb of tin per base box of tin plate were used in 1940, 0.78 lb were consumed in 1947. The ratio remains about the same now. Technical limitations of the electrolytic method are also being solved. Formerly only very light coatings could be applied electrolytically. Now coatings as heavy as 1 lb per base box are possible, and new electrolytic lines are planned which will allow 1¼-lb coatings. The lightest hot-dip coating is 1¼ lb.

Cost Savings—Although the use of electrolytic tin was first principally a conservation measure, today it is paying off in welcome cost-saving dividends for metal can makers whose product is holding its own against fiber and glass container competition partly because of electrolytic economies. Metal can prices have risen, but not as much as general manufactured goods prices.

American Can Co. and Continental Can Co., the major producers, believe concentrated fruit juices will supply a growing market for cans, offsetting some losses in beer and frozen food where bottles and fiber containers are gaining. Metal cans are also being used increasingly to pack insecticides. About 60 to 65 per cent of metal can production now goes for food packs, including fruits, vegetables, milk, fish, sea food, coffee, lard, shortening and meat. The remainder goes for beer, oil, pet food, insecticides and other purposes.

Electrolytic Tops Hot-Dip Tin Plate Output for First Time

(Figures in millions of net tons)



* Estimated.

Metals Output Drops

Domestic production of mercury, tungsten, antimony, manganese in cost-price squeeze

DOMESTIC production of four so-called strategic metals — mercury, tungsten, antimony and manganese— is dropping sharply. Chief causes are high costs of production, low selling prices and inability to compete on the present cost-price basis with foreign producers of the metals.

All of these minerals have great importance in wartime and in peacetime are essential to the steel and other metalworking industries. Although subsidy proposals have been made to help relieve the plight of strategic metal producers there appears to be little chance such help will come from Congress.

This year domestic mercury production—most of it is mined in California and other western states—will drop below 6000 flasks (76 pounds per flask), compared with U. S. production of about 16,000 flasks annually in prewar years and with the wartime peak output of 52,000 flasks a year. More than 85 per cent of domestic requirements of mercury are being supplied by shipments from Spain, Italy and Japan. Current price of about $75 per flask is almost $40 under the cost of domestic production, western mercury miners say.

Antimony production in this country has been halted completely, at least for the present. Nearly all of the U. S. production, which totaled 6400 tons in 1948, comes from the Yellow Pine Mine in Idaho. The mine was closed last spring and will remain closed until the end of this year, possibly longer if the price doesn't improve. Antimony now sells around 38½ cents a pound.

Output of domestic tungsten now totals less than 3000 tons a year, or less than a third of the consumption rate. Production dropped sharply from the rate of 4200 tons produced in 1948 because of closing of the Nevada-Massachusetts Tungsten Mine in Nevada, the country's largest. Reason for the shutdown, company officials say, was the sharp competition from tungsten producers in the Orient.

Most of the manganese produced in the U. S. comes from lower-grade ores, putting domestic miners at a cost disadvantage in comparison with foreign producers. Current price of manganese is said to be only about two-thirds of production cost. As a result, domestic output of the metal is at a rate of less than 100,000 tons a year. Consumption, on the other hand, is around 1.5 million tons annually.

Copper Smelter To Be Closed

American Smelting & Refining Co. will close its copper smelter at Murray, Utah, on Oct. 1 for an "indefinite" period. Operation of the smelter began in 1902.

Reason for the shutdown is cited by the company as due to shortages of ore and "other economic conditions." The closing has been contemplated for several years because of the dwindling ore supply. Raw materials have been insufficient to maintain continuous operation of the smelter for "a long time," the company says.

Strike Cuts Zinc Supply in Half

The nation's supply of zinc has been reduced about 50 per cent by the shutdown of Bunker Hill & Sullivan's smelter at Kellogg, Idaho. The plant was closed by a strike of International Union of Mine, Mill and Smelter workers—CIO.

The Bunker Hill smelter has been turning out about 4000 tons of high grade zinc monthly.

Lincoln Announces Competition

COMPETITION for the James F. Lincoln Arc Welding Foundation Engineering Undergraduate Award and Scholarship Program has been announced for its third year.

Program annually offers $6750 in awards and scholarship funds to engineering undergraduates and to schools for the best papers prepared by undergraduates on arc welded design, research, fabrication or maintenance.

Seventy-seven awards ranging from $25 to $1000 will be awarded to students; $1750 for seven scholarships will be awarded to schools.

Tool Engineers Meet in Montreal

WAYS and means to cut costs will highlight the 17th semiannual meeting of the American Society of Tool Engineers Oct. 27-29 at the Mount Royal Hotel in Montreal.

Cost cutting with tools, cutting costs on dies, cost cutting with machines, estimating and economics of cost cutting are among the major subjects to be tackled at individual sessions.

Plant visits will include tours of Canadian Car & Foundry Co. Ltd., Canadian Vickers Ltd., Dominion Engineering Works Ltd., Northern Electric Co. Ltd., RCA Victor Ltd., Canadair Ltd., Angus shops of Canadian Pacific Railway Co. and Montreal Locomotives Works Ltd.

CALENDAR OF MEETINGS

Sept. 12-16, Instrument Society of America: National conference and exhibit, Municipal Auditorium, St. Louis, Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 12-16, National Association of Corrosion Engineers: Short course in corrosion at University of Texas, Austin. Association headquarters are at 919 Milam Bldg., Houston.

Sept. 14-15, American Home Laundry Manufacturers' Association: Third national home laundry conference, Hotel Commodore, New York.

Sept. 14-16, Porcelain Enamel Institute: 11th annual forum, Ohio State University, Columbus, O. Institute headquarters are at 1010 Vermont Ave. N.W., Washington.

Sept. 15-16, Associated Industries of Cleveland: Fall clinic on industrial relations, Carter Hotel, Cleveland. Group's headquarters are in the N.B.C. Bldg., Cleveland.

Sept. 18-21, American Chemical Society: 116th National meeting, featuring a symposium on titanium, Atlantic City, N. J. Society headquarters are at 60 E. 42nd St., New York.

Sept. 21-24, National Association of Foremen: 26th convention, Hotel Statler and Masonic Temple, Detroit. Association headquarters are at 321 W. First St., Dayton, O.

Sept. 23, Malleable Founders' Society: General meeting, Hotel Cleveland, Cleveland. Society headquarters are in the Union Commerce Bldg., Cleveland.

Sept. 25-28, Controllers Institute of America: 18th annual meeting, San Francisco, Institute headquarters are at 1 E. 42nd St., New York.

Sept. 25-Oct. 1, American Institute of Mining & Metallurgical Engineers: Midyear meeting, Neil House, Columbus, O. Details may be obtained from J. H. Melvin, Orton Hall, Ohio State University, Columbus, O.

Sept. 26-28, National Electronics Conference: 1949 conference and exhibit sponsored by Illinois Institute of Technology, Edgewater Beach Hotel, Chicago.

Sept. 26-28, American Mining Congress: Metal Mining Convention, Spokane, Wash. Congress headquarters are in the Ring Bldg., Washington.

Sept. 26-28, American Management Association: Personnel conference, Waldorf-Astoria Hotel, New York. Association headquarters are at 330 W. 42nd St., New York.

Sept. 26-28, American Mining Congress: Metal Mining Convention, Spokane, Wash. Congress headquarters are in the Ring Bldg., Washington.

Sept. 27-30, American Society of Mechanical Engineers: Fall meeting, Hotel Lawrence, Erie, Pa. Society headquarters are at 29 W. 39th St., New York.

Sept. 29, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo.

Oct. 3-4, National Association of Corrosion Engineers: South central regional meeting, Adolphus Hotel, Dallas. Heading the arrangement committee is G. R. Olson, United Gas Pipe Line Co., Shreveport, La.

Oct. 3-5, American Coke & Coal Chemicals Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute headquarters are at 129 15th St., Washington.

Oct. 3-6, Association of Iron & Steel Engineers: Annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Oct. 4-6, Society of Industrial Packaging & Materials Handling Engineers: Fourth annual exposition, Detroit.

Oct. 6, American Iron & Steel Institute: Regional technical meeting, Drake Hotel, Chicago.

Oct. 10-11, Boston Conference on Distribution: 21st annual affair, sponsored by Boston Chamber of Commerce, Harvard University, Boston University and others.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Production records continue to topple in auto industry, although builders are not operating at theoretical peak. Only Big Three are above one-shift potential

DETROIT

PASSENGER car production records continue to tumble like autumn leaves and there is still virtually no consideration of assembly line cutbacks. Even so, the industry is not operating at its theoretical peak because of the dubious economies of multiple-shift output. There is an apparent unwillingness to work longer than eight hours in a shift, and efficiency drops off rapidly on second and third shifts. General Motors, Chrysler and Ford are figured to be functioning at about 120 per cent of one-shift potential, while the balance of the industry is closer to 90 per cent, an exception of course being Studebaker which has been climbing significantly in its proportion of total industry assemblies.

All monthly production records for the past 52 years were broken by Oldsmobile last month when a total of 31,095 were built, comparing with the previous peak of 28,445 registered in March, 1941. A new daily average record also was set at 1351 cars. The record month of production also placed the division nearer an all-time record for a single model year, car No. 200,000 rolling off the line last month, the first time this mark has been reached in the postwar period. Maintenance of the current pace should bring the model year close to 300,000. Of total August production, 63 per cent were equipped with the V-8 high-compression engine, the balance 6-cylinder units.

Eight-Cylinder Engines Popular

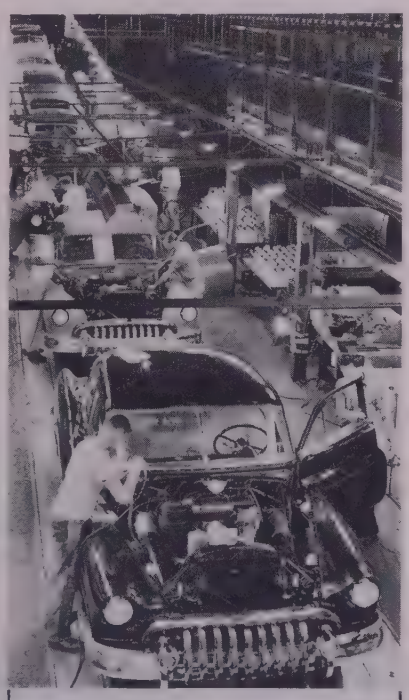
THE FAVOR being shown for 8-cylinder power plants, both the V-8 and in-line types, is common to the entire industry, reflecting the willingness of the public to make the extra cash outlay for the additional power and smoothness.

Some buyers are wondering what is holding up further development and production of the truly high-compression power plant with its predicted economy advantages. General opinion is that the necessary high-octane fuels are not yet ready for general distribution throughout the country, although Dr. Gustav Egloff, research director of Universal Oil Products Co., Chicago, recently told the United Nations Conference that such fuels have been developed. Probably what is delaying the work is the necessary time interval between development and commercial distribution, since many problems need to be worked out on this score.

It will be a simple matter to adjust compression ratio upward on the new Olds and Cadillac engines, not so simple on some of the older in-line engines. Around 7.5:1 is the top limit on the latter units and to go beyond that is going to mean manufacturing completely new engines. Over the next five years, there should be a number of such introductions.

GM Stages Auto Show at Fair

GENERAL MOTORS sponsored a full-size auto show at the Michigan State Fair in Detroit last week, with 25 cars and trucks on display, along with an Allison jet engine, the Oldsmobile V-8 engine exhibit, the evolution of the Fisher Body, and a Pontiac chassis. Three new scientific demonstrations were programmed. One showed a simplified model of a high-compression engine, using a single cylinder and arranged so that the degrees of compression could be varied to give a quick picture of the difference in power. A second was a graphic showing of how properly turned vibrations could shatter hard materials such as glass. The third demonstration showed the manufacture of synthetic rubber by one of the newest methods. A sodium compound was poured into a bottle partly filled with a clear liquid. In less than a minute after shaking, a mass of soft, white rubber spurted from the mouth of the bottle, occasionally 10 feet into the air.



BUMPER-GRILLE TO BUMPER-GRILLE: The Buick Specials, easily identified by their distinctive fronts, are in volume output on the Buick production lines

K-F To Open Western Plant

THE FIRST unit in the Kaiser-Frazer decentralization program will go into operation next month at Long Beach, Calif., where 20 cars a day will be assembled from "bodies-in-white," frames, engines, transmissions, wheels, etc., shipped from the Willow Run plant. Through the program, K-F hopes to build closer ties with various local areas, and, in turn, improve public acceptance of its product. Another important consideration is savings in freight costs. The company is quoted as saying it can ship 12 bodies in the white for what it costs to ship four assembled cars.

A second unit is being discussed for Portland, Oreg., and if the plan proves successful, it may be followed by the establishment of larger plants around the country which could supply assembled bodies from components produced at Willow Run and in turn ship the bodies to the smaller assembly plants where they would be painted, trimmed and fitted to chassis. Final assembly plants are not expected to require more than 100-150 men and with small crews such as this, management could keep in close touch with all personnel, thereby realizing better labor relations.

In recent months there has been a considerable trimming of purchasing and follow-up personnel at the Willow Run plant. In one department which for a time had 60 buyers and follow-up men the staff has been cut to three, resulting in the loss of jobs by many who had been with the company ever since it started four years ago. Unconfirmed is the

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report that K-F is shipping cars on consignment to dealers in certain sections of the country. This would mean that dealers would have to put up no money until the car actually was sold to the ultimate owner.

Noises Classified

SERVICE engineers for the GMC Truck & Coach Division, after lengthy study and intensive pondering, have come up with a classification of seven kinds of noises which develop in motor vehicles. They say the resulting standardization of vocabulary terms will prove a boon for mechanics everywhere, since it will permit harassed owners accurately to describe bothersome noises. A squeak, for example, might be identified as a chirp, squeal, screech or canary. Now it is just a squeak. Other basic noises will be known as rattles, thumps, grinds, knocks, scrapes or hisses, and service crews may now rest more easily.

New Models To Be Introduced

IN THE NEXT four months there should be coming half a dozen or more 1950 passenger car models. Nash will make its announcement this month, with cars already in production. Hudson is readying plans for a distinctive new job in the next month or two. General Motors will have new "C" bodies coming out on Cadillac, Buick and Oldsmobile before the end of the year, while Chrysler also is making some body changes on its line, likely by December or sooner. Ford's plans do not seem to have crystallized fully, although Lincoln and Mercury are expected to lead the new model parade from this manufacturer. Ford has been holding back on a new "fast-back" model which could be placed in assembly without delay should it be decided that the market is ready for it.

Pontiac and Chevrolet are not expected to have their 1950 stuff ready for display before January and the changes will not be extensive inasmuch as new body styles were brought out this year, and the next series will involve mainly trim and decorative changes. Reports of a new Pontiac 8-cylinder engine are discredited. Chevrolet will have available a new 6-cylinder power plant, especially designed to provide the increased power required for its torque-converter transmission.

Chrysler Elevates Two

L. L. "TEX" COLBERT, president of the Dodge Division of Chrysler, has been elected a vice president and director of the corporation, and George W. Troost, comptroller, has been named a vice president.

Mr. Colbert's election as a director increases the Chrysler board to 21 members. Mr. Colbert joined Chrysler in 1933 and during the war directed operations of the Dodge-Chicago aircraft engine plant which built better than 18,000 Wright engines for the B-29 bomber. A graduate of the University of Texas and Harvard Law School, he was associated with a law firm before coming to Chrysler as resident attorney.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,996
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	675,000*	478,186
September		437,181
October		516,814
November		495,488
December		514,337
12 mos.		5,549,323

*Preliminary.

Estimate for week ended:

	1949	(Same Week) 1948
Aug. 13	144,317	112,342
Aug. 20	149,359	113,324
Aug. 27	155,367	100,699
Sept. 3	148,415	101,879
Sept. 10	120,000	78,677

Estimates by Ward's Automotive Reports

What Price Cars?

NOTION that the automotive industry should be producing a $1000 automobile is challenged by E. R. Breech, Ford executive vice president, in a brochure which examines cost problems facing the industry.

Mr. Breech takes issue with recent statements by R. E. Olds, automotive pioneer, that the industry should make cars to sell under $1000, and that today's autos carry too many gadgets.

The gadgets which adorn today's cars, says Mr. Breech, are demanded by the customers. The public, he insists, is not ready to "take a lower standard of living in its automobiles."

Taxes 25 Per Cent of Price—Mr. Breech points out that at least 25 per cent of the selling prices of today's automobiles go for taxes—federal, state and local. Part of the increase in taxes results from the cost of the war and the general inflation in the cost of government.

Meanwhile, the direct costs of the automakers have soared. In 1939 Ford hourly rated employees received a direct wage of 90 cents an hour plus about 4 cents in direct and indirect benefits. Today the average wage cost of hourly-rated employees is $1.92 an hour, an increase of 104 per cent.

Smallness Not Answer—Mr. Breech derides the idea that a cheaper car can be built merely by making it smaller.

"Economy in building an automobile is not all in just cutting down the size of the car. Even Ford's famous Model A which delivered in Detroit for about $600 in 1930 would now have to retail at about $1200, or perhaps more."

As long as the average American wants to pull up hills in high gear or speed along the highway at 75 to 90 miles an hour, reducing the price of cars is not going to be as easy to accomplish as to talk about.

Mr. Breech says, however, that auto builders will continue to seek new ways to reduce costs.

Fruehauf Sales Dip

POSSIBILITY of changes in size and weight laws for commercial vehicles by state legislatures was an important factor contributing to the lower sales volume of Fruehauf Trailer Co. for the first half year. Sales in the first six months this year were $38 million, compared with $42.7 million in the like 1948 period.

Trailer operators have been inclined to hold off purchases until the new weight and size limits are determined, says Harvey C. Fruehauf, president, in a letter to stockholders. "This situation has been gradually clearing and should soon cease to be a restrictive factor."

Fruehauf is concentrating on standard models and trying to get away from custom jobs. High labor costs and low worker efficiency have boosted costs of the custom models to five or six times what they were in 1936.

Willys Resumes Operations

WILLYS-OVERLAND resumed operations last Tuesday after being closed since Aug. 19 for inventory taking. This week an assembly rate of 425 vehicles a day is scheduled, approximately the same as before the closing.

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STANDARD STRUCTURAL ALLOY
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CARBON TOOL
MAGNAFLUX — AIRCRAFT QUALITY

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Elliott Broadens Line

Purchase of Crocker-Wheeler Division enlarges firm's range of motors and generators

ELLIOTT CO., Jeannette, Pa., has acquired the business and assets of Crocker-Wheeler Division, Ampere, N. J., Joshua Hendy Corp. The new division manufactures electric motors and generators and its addition gives Elliott a complete line of alternating and direct current motors ranging from 1 to 25,000 hp. Prior to this time Elliott's line did not include motors and generators under 200 hp.

A leading builder of power and process equipment, Elliott Co. manufactures large electric motors and generators at its Ridgway, Pa., plant. Since World War 1 the company has been a large supplier of submarine equipment and rotating machinery for electric generating stations and power transmission systems.

Crocker-Wheeler manufactures motors and generators for the steel industry and has pioneered in the application of electrical equipment in a number of other industries. It will continue to operate as the Crocker-Wheeler Division headed by: Charles A. Butcher, vice president; P. J. Moore, sales manager; and F. W. Mencik, works manager.

Fabricator Widens Distribution

UNITED STEEL FABRICATORS Inc., Wooster, O., will broaden distribution of a new line of hollow steel doors and frames through building supply dealers.

The firm up to now has been selling exclusively to major building projects requiring mass production quantities. Among recent projects furnished were Peter Stuyvesant Town, Peter Cooper Village, Riverton, Fordham Hill, Parklabrea, and Parkmerced, all large scale multiple dwelling projects in New York and California.

Shell's New Houston Laboratory

CONTROL TESTING of refining operations at the huge Deer Park Refinery of Shell Oil Co. Inc. near Houston is conducted in a new $650,000 process and product quality control laboratory. It was designed by Austin Co.

Located midway between Shell's recently completed lube oil plants and "cat cracker" and joining other major manufacturing units at Deer Park, the E-shaped building is of face brick and steel construction. It provides 20,000 sq ft of floor space.

GLASS ENVELOPE: Generous use of glass partitions allows segregation of tests and personnel in the envelope of outside rooms filled with special equipment in Shell Oil Co.'s Deer Park Refinery process and product quality control laboratory near Houston. A row of distillation machines for testing gasoline, solvents and gas oils are in the center of the inspection division pictured here

Laboratory has been laid out to enable Shell technicians to handle work on crude evaluation and by-product development.

Reliance Sends Technician Abroad

SUPERVISING tune-up of Reliance Electric & Engineering Co.'s equipment going into operation in Europe will be the job of a technician sent abroad by the Cleveland company.

Clarence J. Marx will establish headquarters in England for technical assistance to companies using Reliance electric motor drives and related equipment in England, France, Sweden, Austria, Italy and Belgium. He will be available, too, for assisting foreign representatives of American machinery manufacturers who have electrical equipment problems. His dispatch marks the extension abroad of application engineering services of Reliance.

New Aluminum Extrusion Plant

WITHIN five weeks of the time it was allotted 45,000 sq ft of space in Magnolia, Ark., Southern Extrusions Co., extruder of aluminum shapes, rods and bars, moved into its modern brick building.

Based on production figures of the past several months, capacity of company's first press is in excess of 200,000 pounds monthly. About 75 per cent of the equipment was designed and fabricated on the site by the owners, R. W. Sullivan, H. N. Sebring and J. A. Ida, who designed and constructed an aluminum extrusions plant in Charlotte, Mich., and a plant for Youngstown Mfg. Co. in Youngstown.

Many new ideas were engineered to increase production and to cut scrap loss to maximum of 15 per cent. Dies are changed without interfering with operations of the first press, especially designed for light weight sections. A larger extrusion press and heat treating facilities are now being planned.

Cambridge Gas Light Building

EXTENSIVE ADDITIONS to its oil-gas generating plant at Cambridge, Mass., are being made by Cambridge Gas Light Co.

Increasing availability and low cost of heavy, high carbon oils make it desirable to remodel existing equipment or install new gas generating equipment to utilize these heavy oils. Cambridge decided to rebuild one of its existing oil-gas sets and to construct one of new design. Construction work now in progress is being carried on by Gas Machinery Co., Cleveland. Estimated cost of current improvement program is in excess of $350,000. This includes building changes.

Briefs . . .

Paragraphs on developments of interest and significance within the metalworking industry

Carboloy Co. Inc., Detroit, appointed Tool Supply & Engineering Co., Dallas, distributor for Dallas and northern Texas and W. S. Ehrenfeld Co., York, Pa., distributor for York and vicinity. Carboloy makes cutting tools, grinding wheels and abrasives.

—o—

Graver Tank & Mfg. Co. Inc., East Chicago, Ind., has established Graver Water Conditioning Co. to extend operations which had been conducted by the Graver Water Conditioning and Process Equipment department. Products of Graver include deaerating heaters, reactivators, chemical feeders and hot process softeners.

—o—

Mid-States Welder Mfg. Co., Chicago, has been formed to take over manufacture of the welding equipment lines formerly produced by Mid-States Equipment Corp. An auxiliary product, the Mid-States Saw Gun is being produced by the company which is continuing output of arc welders, accessories, the "Missing Link" High Frequency Arc Stabilizer and the 9000 Arc Torch.

—o—

Plans to invest $6,819,000 in plant outlay in the Chicago area in August were announced by 27 companies. August figure brings total amount for industrial expansion in the first eight months of the year in the six-county area to $67,752,000. Comparable total in 1948 was $89,001,000. Commitments in August last year amounted to $8,653,000.

—o—

Seven leading British engineering trade associations have formed the Canadian Exhibition Committee to handle composite display of their latest products and research results at the 1950 Canadian International Fair to be held in Toronto May 29 to June 9, 1950. Thus does an important section of British engineering industry make a determined bid for more Canadian dollars.

—o—

Uranium-bearing ore, samarskite, a deposit of which is being developed in Clark county, Nevada, is reported to contain 11 per cent uranium. This makes it the richest deposit found thus far in Nevada.

—o—

Elastic Stop Nut Corp. of America, Union, N. J., has completed arrangements for enlarging channels of distribution of ES-nails, new type of fasteners for attaching wood, asbestos or asphalt shingles to insulation sheathing without use of wood stripping. ES-nails are now being sold through distributors of Johns-Manville Sales Corp., Weatherbest Corp., Creo-Dipt Co. Inc., Homasote Co., National Gypsum Co., Keasbey & Mattison Co., American Stained Shingle Co., Phillip-Carey Mfg. Co., Supradur Corp. of New York and Smith Asbestos Products Inc. ES-nails are also sold through wholesale distributors of Elastic Stop Nut.

—o—

Lycoming and Spencer Heater divisions of Avco Mfg. Corp., New York, have been integrated into a single operating unit at Williamsport, Pa. It will be known as Lycoming-Spencer Division. Lycoming - Spencer operations include aircraft engines and related products, precision machine parts, gray iron castings and boilers.

—o—

"Bible" of aircraft designers who use metal, "Strength of Metal Aircraft Elements" is out in a revised edition. Booklet is a one-step reference for metal aircraft designers and is used in university design courses and aircraft factories. Materials producers co-operated with the Civil Aeronautics Administration and government agencies in its preparation. Booklet is available for $1.25 from the Superintendent of Documents, Washington 25.

—o—

Geometric Tool Co. Division of Greenfield Tap & Die Corp., New Haven, Conn., manufacturer of machines and tools for cutting screw threads, appointed George Worthington Co., Cleveland, distributor for that city and its vicinity.

—o—

Reynolds Metals Co., Richmond, Va., appointed two new distributors of its aluminum pig and ingot products: Brumley-Donaldson Co., Huntington Park, Calif., and Colonial Smelting & Refining Co., Columbia, Pa.

—o—

E. W. Bliss Co.'s Detroit district sales office is now located in the Fisher Bldg., Room 2214, Detroit. Bliss manufactures mechanical and hydraulic metalworking machinery, rolling mill equipment, presses and dies, and can and container making machinery.

—o—

Thew Shovel Co., Lorain, O., has just released a 16 mm sound film in full color. The film, "Lorains in Industry," takes 28 minutes to screen and shows the use of Lorain machines for industrial materials handling. Lorain distributors throughout the country have the film available for showing on request.

—o—

American Can Co., New York, has taken more than six floors—180,000 sq ft of space—in the new 36-story office building under construction at 100 Park Ave. Initial occupancy is being planned for late in December in the fully air-conditioned office building rapidly being completed (STEEL, Aug. 15, p. 67.)

—o—

Illinois Institute of Technology will offer an evening course in materials handling beginning Sept. 23 and running through Jan. 20, 1950. Course will be given by Irving M. Footlik, general manager of Galter Products Co. and secretary of the American Materials Handling Society.

—o—

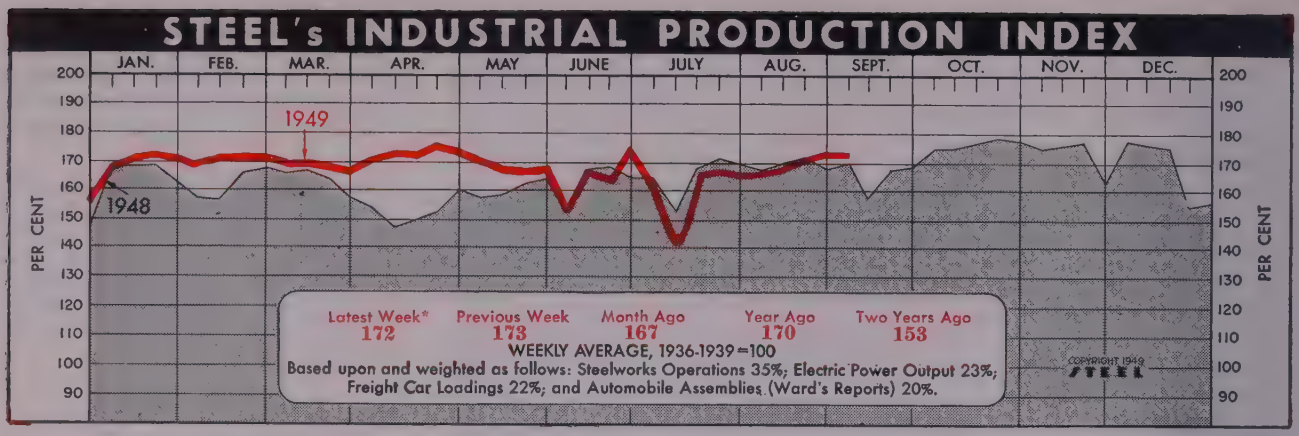
National Foundry Association's Membership and Public Relations committees completed the 1949 manual of services which outlines functions of NFA in the foundry field. Distribution of the booklet, "The Association of Foundry Management," is expected to be completed this week. It covers in detail legislative and industrial relations activities and newly developed regional offices of NFA.

Nailing Down the Job

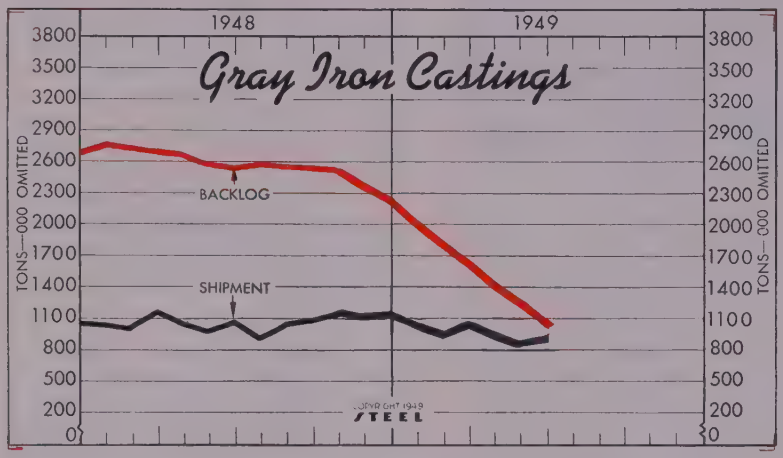
TO TAKE the guess work out of nail estimates for particular jobs, Nichols Wire & Aluminum Co., Davenport, Iowa, has brought out a line of 32 different types and sizes of aluminum nails, packaged for the job.

Company's Never-Stain aluminum nails are packed in attractive boxes containing 290 to 3150 nails, depending on type and size. Each box is plainly marked showing coverage: The label on a box of 8d wood siding nails with sinker heads would read in part, "Contents 575 8d Never-Stain aluminum wood siding nails with sinker heads. Sufficient for applying 500 board feet of ¾" x 8" bevel siding."

For use when applying a different size siding is a table giving coverage of ½" x 6" or ¾" x 10" bevel siding. Similar coverage tables appear on the 32 boxes, each of which is in a different color to aid identification. A four-tier display rack has been designed to hold the boxes.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1949
1948
Latest Week* 172
Previous Week 173
Month Ago 167
Year Ago 170
Two Years Ago 153
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1949 STEEL

*Week ended Sept. 3 (preliminary).



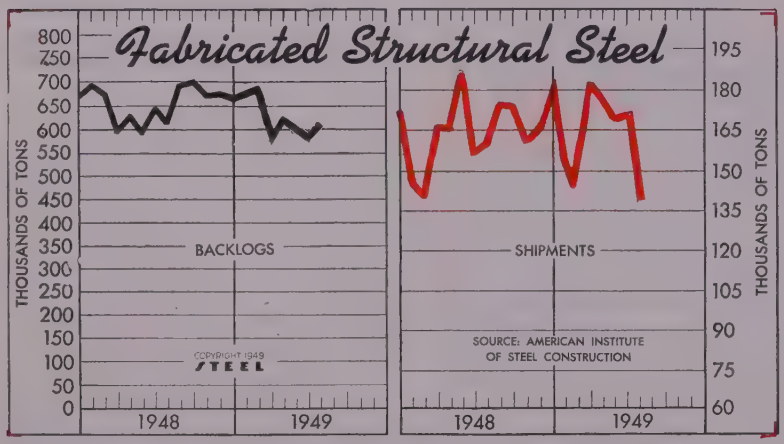
Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

	Shipments		Backlogs*	
	1949	1948	1949	1948
Jan.	1,040	1,064	2,065	2,803
Feb.	987	1,024	1,857	2,769
Mar.	1,075	1,169	1,639	2,726
Apr.	929	1,051	1,446	2,691
May	867	993	1,243	2,602
June	906	1,072	1,087	2,587
July	....	914	....	2,601
Aug.	....	1,051	....	2,599
Sept.	....	1,088	....	2,587
Oct.	....	1,148	....	2,523
Nov.	....	1,100	....	2,407
Dec.	....	1,111	....	2,284
Total	....	12,786		

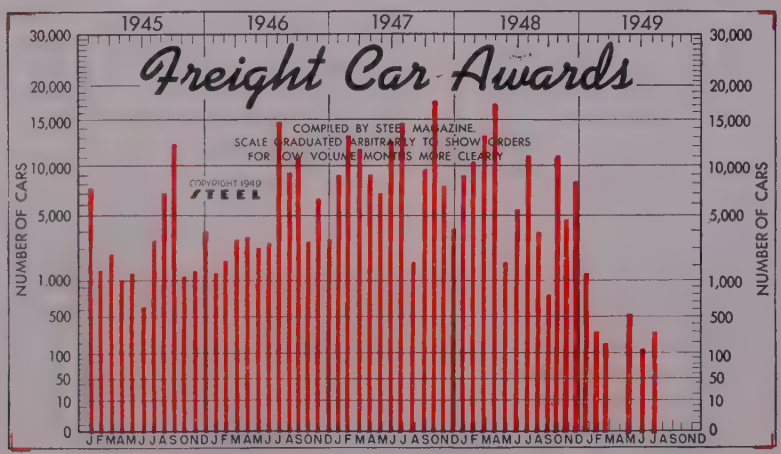
* Unfilled orders for sale to the trade.



Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1949	1948	1947	1949	1948	1947
Jan.	152.7	146.4	140.6	675	692	661
Feb.	145.9	141.6	136.1	683	673	656
Mar.	185.9	167.0	137.8	582	597	614
Apr.	179.2	166.7	157.4	628	630	632
May	171.1	186.9	155.0	599	593	628
June	172.3	157.1	151.9	583	647	634
July	141.1	160.8	169.9	605	613	661
Aug.	....	176.3	158.0	...	691	639
Sept.	....	175.0	164.3	...	698	648
Oct.	....	164.0	196.1	...	669	649
Nov.	....	169.8	175.0	...	673	645
Dec.	....	182.4	173.0	...	670	671
Total	....	1,993.9	1,915.1			


1945 1946 1947 1948 1949
Freight Car Awards
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS
COPYRIGHT 1949 STEEL
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Freight Car Awards

	†*1949	*1948	*1947	*1946	1945
Jan.	1,663	8,613	9,222	1,481	7,200
Feb.	332	10,698	13,724	2,328	1,750
Mar.	219	13,227	12,048	4,512	2,500
Apr.	30	17,215	9,186	3,564	1,120
May	589	2,228	7,389	2,900	1,526
June	153	5,368	12,784	3,335	670
July	408	11,308	14,840	14,836	3,500
Aug.	....	3,638	2,352	9,527	7,240
Sept.	....	738	9,917	11,102	12,840
Oct.	....	10,931	17,737	3,407	1,320
Nov.	....	4,852	8,079	7,190	1,650
Dec.	....	8,368	4,030	3,011	4,116
Total	....	97,184	121,308	67,193	45,432

* American Railway Car Institute.
† Preliminary.

The Business Trend

CONTINUED improvement in the steel rate failed to offset the decline in automotive assemblies in the week ended Sept. 3, causing STEEL's industrial production index to dip 1 point to 172 per cent (preliminary) of the 1936-1939 average from 173 in the preceding week. The index for the latest week is 2 points higher than in the corresponding week of 1948, the second consecutive week in which the latest week index tops that for a year ago.

STEEL—Production of steel for ingots and castings advanced to 86 per cent of capacity in the week ended Sept. 3 from 84.5 per cent in the preceding week. In the corresponding week last year the rate was 95 per cent. Opinion in the industry is divided as to future operations. Some see the current upswing resulting from stockpiling against a possible steel strike and others think the rise, in part at least, is due to steel consumers returning to normal buying patterns after depletion of excess inventories.

AUTOMOBILES—The decline in passenger car and truck assemblies to 148,415 in the week ended Sept. 3 from 155,367 was caused primarily by suspension of Saturday operations because of the holiday weekend. September schedules by most builders call for a continuation of August's hectic pace, with passenger car output for all of 1948 expected to be surpassed during this month. As of Sept. 5, passenger car output in U. S. plants for 1949 was estimated at 3,477,555, compared with 3,912,215 for all of 1948.

COAL—Bituminous coal stockpiles declined to 69.1 million tons on Aug. 1 from the postwar high of 74.2 million tons a month earlier, showing the effect of the miners' three-day work-week. This decrease in stocks resulted despite a reduction in consumption to 28.9 million tons in July from 32.6 million tons in June. Industrial stocks averaged 83 days on Aug. 1, an increase from the 80-day average a month earlier. Stocks on hand in various industries were: Electric power utilities, 126 days; coke ovens, 61 days; steel and rolling mills, 75 days; cement mills, 72 days; railroads, 54 days; other industrials, 90 days.

RAILROADS—Net income of Class 1 railroads in July amounted to an estimated $27.2 million, after interest and rentals, compared with $76.7 million in July a year ago, reports the Association of American Railroads. Net income for the first seven months of 1949 is estimated at $200 million, well below the net income of $336 million for the same period in 1948.

BUSINESS—New business incorporations declined to 6424 in July from 7260 in June. Totals compiled by Dun & Bradstreet Inc. show the aggregate for the first seven months of this year to be 50,307 company formations, the smallest seven months total in the postwar period.

CONSTRUCTION—Civil engineering construction volume throughout the U. S. totaled $155.2 million for the week ended Sept. 1, five per cent above the volume for the preceding week and 6 per cent above the corresponding week last year.

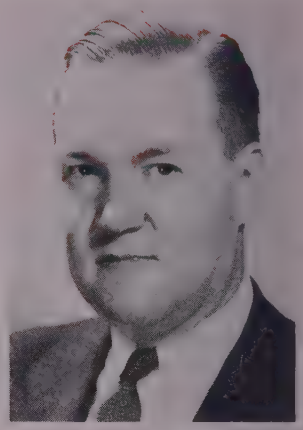
BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	86.0	84.5	81.5	95.0
	Electric Power Distributed (million kilowatt hours)	5,544	5,523	5,466	5,470
	Bituminous Coal Production (daily av.—1000 tons)	1,250	1,258	1,227	2,036
	Petroleum Production (daily av.—1000 bbl)	4,700‡	4,717	4,670	5,531
	Construction Volume (ENR—Unit $1,000,000)	$155.2	$147.7	$239.2	$146.8
	Automobile and Truck Output (Ward's—number units)	148,415	155,367	142,718	101,879
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons. ‡Preliminary.				
TRADE	Freight Car Loadings (Unit—1000 cars)	720†	749	717	895
	Business Failures (Dun & Bradstreet, number)	165†	176	171	94
	Money in Circulation (in millions of dollars)‡	$27,389	$27,328	$27,419	$28,072
	Department Store Sales (changes from like wk. a yr. ago)‡	—1%	—7%	—11%	—8%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$11,322	$12,341	$12,600	$11,938
	Federal Gross Debt (billions)	$255.9	$255.3	$254.2	$253.1
	Bond Volume, NYSE (millions)	$10.0	$11.4	$17.1	$14.0
	Stocks Sales, NYSE (thousands of shares)	3,535	3,662	5,280	3,776
	Loans and Investments (billions)†	$65.1	$64.7	$63.5	$63.2
	United States Gov't. Obligations Held (millions)†	$37,114	$36,485	$35,590	$34,702
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Composite Finished Steel Price Average	$91.55	$91.55	$91.82	$93.86
	STEEL's Nonferrous Metal Composite‡	180.6	180.3	179.1	218.8
	All Commodities†	152.4	151.9	152.6	168.9
	Metals and Metal Products†	167.9	167.9	167.9	171.9
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100.				

Men of Industry

HENRY WEBER

A. P. SCHMAUCH



JOHN H. FAUNCE JR.

Henry Weber, affiliated with Cleveland Chain & Mfg. Co., Cleveland, for over 40 years, has been named general superintendent and production manager of its Fire Weld Division. He formerly was assistant to the late **Eli A. Round,** fire weld chain authority, who had been with Cleveland Chain 42 years. **Willis J. Keenan** has been placed in charge of a new district sales office opened in Philadelphia by Woodhouse Chain Works, Trenton, N. J., an associate concern. He formerly was affiliated with Bridgeport Chain & Mfg. Co., also an associate company of Cleveland Chain & Mfg. Co.

—o—

Universal-Cyclops Steel Corp., Bridgeville, Pa., announces that **G. B. LeVan** has been appointed general manager, and **E. H. Broadhurst,** works manager of its Cyclops Division plant at Titusville, Pa., where for several years Mr. LeVan has been assistant general manager, and Mr. Broadhurst, superintendent.

—o—

W. C. Snyder Jr., vice president in the Engineering & Construction Division of Koppers Co. Inc., Pittsburgh, for the last two years, has been assigned to manage the metallurgical department of that division. Since joining Koppers in 1947, Mr. Snyder has been Chilean contract manager, guiding the company's activities near Concepcion, Chile, where the Engineering & Construction Division is supervising the erection, and will inaugurate operation of an integrated steel mill for Pacific Steel Co. of Chile. **Peter V. Martin** has been appointed assistant manager of the metallurgical department, and **C. A. Kral** as special assistant. Mr. Kral will go to Chile as Koppers' Chilean management representative.

—o—

A. P. Schmauch has been appointed manager of industrial engineering for Rockwell Mfg. Co., Pittsburgh. Before joining Rockwell he spent several years with Albert Ramond & Associates as a consulting production and industrial engineer. He also had been affiliated with Armco Steel Corp., Republic Steel Corp. and Pharis Tire & Rubber Co.

—o—

Food Machinery & Chemical Corp., San Jose, Calif., announces appointment of **Gerald F. Twist** as manager of its Peerless Pump Division, with headquarters in Los Angeles. He succeeds **Francis F. Fairman Jr.,** who is resuming his former association with General Electric Co. Mr. Twist had been a director and executive vice president of Atlas Imperial Diesel Engine Co., Oakland, Calif., and resigned in 1947 to take charge

GERALD F. TWIST

of Food Machinery & Chemical Co.'s new corn harvester manufacturing operation in Indiana. In January of this year he was elected a vice president and manager of FMC's newly acquired subsidiary, Stokes & Smith Co., Philadelphia.

—o—

John H. Faunce Jr. has been named manager of sales promotion, Lukens Steel Co., Coatesville, Pa. For the last three years he has been district manager of sales at the Chicago office. Prior to World War II Mr. Faunce was associated with Armco Steel Corp., Middletown, O., for five years, serving respectively as manager of industrial markets and manager of development engineering departments. He left Armco for service with the U. S. Navy, at the conclusion of which he became associated with Lukens Steel Co.

—o—

Vance Iron & Steel Co., Chattanooga, Tenn., warehouse subsidiary of Republic Steel Corp., Cleveland, announces appointment of **Lowell H. Greene** as general manager, succeeding **J. B. Roberts,** resigned. Mr. Greene joined the Vance organization early this year. He began his career in the steel business with the Bourne-Fuller Co., Cleveland, a steel warehouse and supply company now a part of Republic. Before moving to Chattanooga he had been a field representative for the tool steel department of Republic's Bolt & Nut Division for 12 years.

—o—

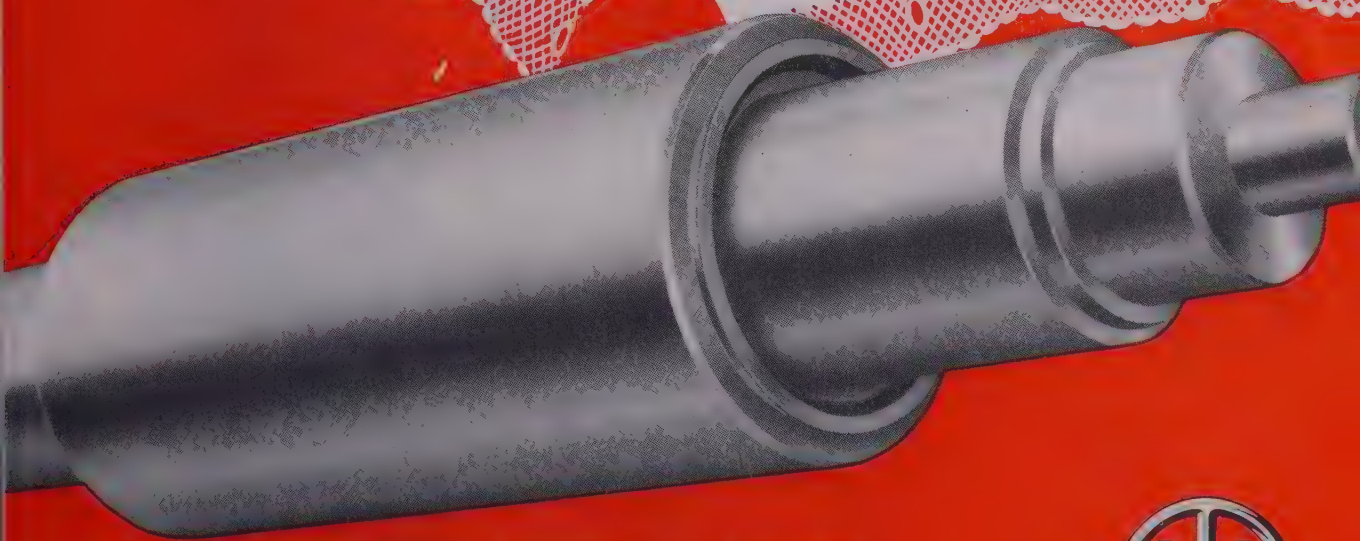
C. W. Floyd Coffin has been elected chairman of the board of directors, American Arch Co., New York, railroad equipment firm. He has held the post of vice chairman of the

More tonnage between dressings

The true test of a roll's value is the length of time it will hold its shape and size in the mill. If it holds up longer between dressings, that means less down time . . . more profit.

Ohio Rolls can help you set new production records. Our testing facilities assure rugged rolls, free of detrimental flaws.

Select from any of these eleven types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioloy Rolls, Ohioloy "K" Rolls, Holl-O-Cast Rolls, Chilled Iron Rolls, Alloy Chilled Iron Rolls, Denso Iron Rolls, Nickel Grain Rolls. Special Iron Rolls, Nioloy Rolls, Flintuff Rolls.



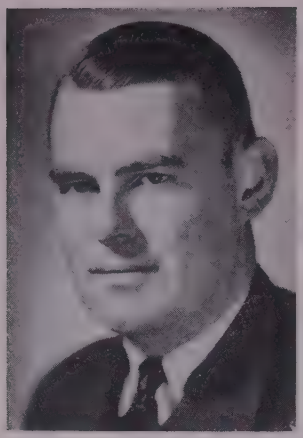
Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO

Plants at Lima and Springfield, Ohio



JOHN F. MILLER

board. **William F. Walsh,** member of the New York law firm of Walsh & Levine, has been elected a director. Mr. Coffin is a vice president and director of Franklin Railway Supply Co. and a director of Lima-Hamilton Corp., Combustion Engineering-Superheater Inc. and Balmar Corp.

—o—

John F. Miller has been appointed manager, Tool Division, Illinois Tool Works, Chicago. He formerly was sales manager, Machine Tool & Cutting Tool Division, Ex-Cell-O Corp., Detroit.

—o—

T. Max Stanger has been appointed to the sales staff of American Wheelabrator & Equipment Corp., Mishawaka, Ind. He will have his headquarters in Salt Lake City, Utah, where the company has not previously had a sales office. Mr. Stanger joined the company's service engineering staff two years ago, and previously was with American Foundry & Machine Co.

—o—

Charles H. Goddard has been appointed manager of utility sales for Sylvania Electric Products Inc., New York. In his new assignment he will be in charge of sales of all lighting equipment to municipalities, railroads and other transportation companies, central station sales and large utility accounts. **Thomas D. Fuller,** formerly industrial engineer, has been transferred to the sales merchandising department, Radio Division, Emporium, Pa.

—o—

A. H. Loux has been named manager of distributor sales for Flexible Tubing Corp., Branford, Conn.

—o—

Whiten Machine Co., New London, Conn., announces opening of its Chicago office, with **Vincent T. Peterson** as factory representative. Mr. Peterson will be in charge of sales for lathe chucks, centering machines, special purpose milling machines, and gear cutting machines in Indiana, Illinois, Michigan and Wisconsin.

—o—

Frederic I. Lackens, for 12 years advertising manager, Hays Corp., Michigan City, Ind., will retire in October.

—o—

F. J. Stokes Machine Co., Philadelphia, announces appointment of **Richard V. D. Strong** as district manager of its Chicago office.

—o—

Phillips B. Hoyt has been named director of purchases, American Car & Foundry Co., New York, succeeding **A. A. Borgading,** retired after 42 years' service. Mr. Hoyt will have executive and administrative control of ACF's procurement of carbuilding and other materials. Prior to joining ACF Mr. Hoyt was with Ingersoll-Rand Co., Phillipsburg, N. J., for 22 years.

—o—

Francis R. O'Brien has been named head of the Engineering Division of Southern Research Institute. He has been director of the engineering experiment station at the University of Alabama.

—o—

W. E. Kerr has been elected president of Pennsylvania Transformer Co., Pittsburgh. He succeeds **Samuel Horelick** who has been president for 20 years, and who now assumes the position of chairman of the board. **W. R. Swoish** has been elected vice president, and also retains his position of sales manager of the company. **Samuel Dickson** was named treasurer, and **F. W. Dierker,** assistant treasurer.

—o—

John H. Biggs, former Rochester, N. Y., representative, has succeeded **Thomas F. MacLaren** as representative in the Philadelphia office of Brown & Sharpe Mfg. Co., Providence, R. I. Mr. MacLaren will assume other responsibilities with Brown & Sharpe.

—o—

Paul T. Vanness has been appointed controller of International Business Machines Corp.'s Plant No. 2 at Poughkeepsie, N. Y. He joined IBM in 1937 as a sales representative in Washington. He served in various sales and executive capacities in Baltimore, Newark, N. J., Washington, Dayton, O., and Detroit, and since July of this year has acted as assistant to **D. L. Bibby,** general manager of the Poughkeepsie plant.

—o—

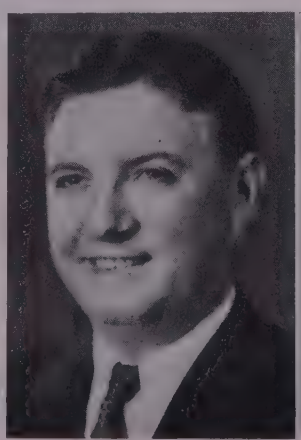
W. Paul Jones has been elected president, general manager and a director of Servel Inc., Evansville, Ind. He succeeds **Louis Ruthenburg,** president since 1934, who has been elected chairman of the board and chief executive officer. Mr. Jones has resigned as vice president, Refrigeration Division, Philco Corp., Philadelphia, and as a director of Philco, to accept the new post.

—o—

Thomas A. Kennally has been appointed president of the Refrigeration Division of Philco Corp., Philadelphia. He has been with the company 25 years in the development, manufacture and distribution of the company's products. Mr. Kennally became vice president in charge of sales in 1941 and vice president and assistant to the president in 1948.

—o—

Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia, announces appointments as follows: **John A. Robinson,** named regional sales manager for the midwest, northwest, Rocky Mountain and Pacific Coast areas, with headquar-



W. E. KERR

SAMUEL HORELICK

W. R. SWOISH

LOMBARD COMBINES THESE VITAL ENGINEERING ELEMENTS

RESEARCH AND DESIGN

ENGINEERING AND MACHINE CONSTRUCTION

FIELD SERVICE

CHOOSE ONE OR ALL
To Solve Your Particular Problem

RESEARCH AND DESIGN . . .

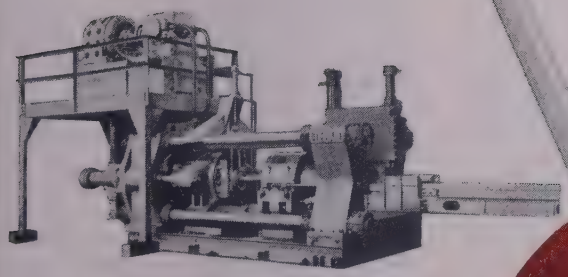
Give us your toughest engineering problem and we'll develop the practical, efficient method or process for your profitable production.

ENGINEERING AND MACHINE CONSTRUCTION . . .

Whether it's a mechanical punch or forming press . . . a hydraulic extrusion press or intensifier system . . . complete plant design including construction and installation of industrial buildings and machinery, Lombard "Packaged Engineering" embraces the entire responsibility.

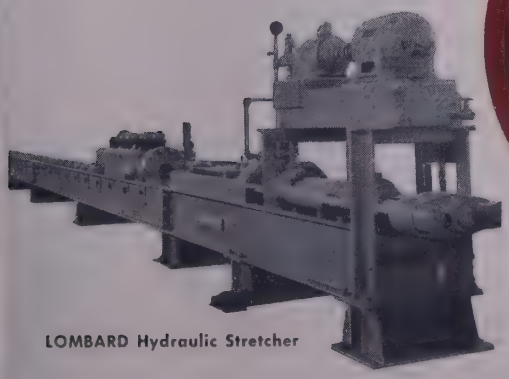
FIELD SERVICE . . .

This is one of the *Pluses* Lombard offers. Lombard engineers stay on the job until equipment is in complete and satisfactory operation.



LOMBARD Four-Column Hydraulic Extrusion Press

LOMBARD Hydraulic Test Bar Shear



LOMBARD Hydraulic Stretcher

INVESTIGATE LOMBARD Packaged Engineering TODAY!

LOMBARD CORPORATION
ENGINEERS AND DESIGNERS
EMPIRE BUILDING • YOUNGSTOWN 3, OHIO

EQUIPMENT MANUFACTURED BY UNITED ENGINEERING AND FOUNDRY CO., PITTSBURGH, PA.

ters in Chicago where he has been branch industrial manager, and **Charles E. Sharp,** appointed to succeed Mr. Robinson in Chicago; **Charles D. McIntire,** named industrial sales manager, Cincinnati branch office, succeeding **George Brown,** assigned to promotion of products of Honeywell's Belfield Valve Division in the central states region, with headquarters in Cleveland; **John E. MacConville,** named industrial sales manager, Atlanta branch sales office, and also in charge of industrial sales activities out of the Birmingham, Jacksonville, Fla., and Knoxville, Tenn., offices; and **William C. Waltman,** placed in charge of industrial sales out of the South Bend, Ind., office, succeeding **George Gilliam,** recently appointed to supervise pyrometer supplies sales for the company.

—o—

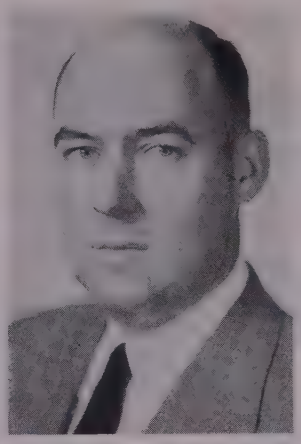
Allen D. Gutchess has retired as chairman of the board of De Vilbiss Co., Toledo, O. He has been associated with the company for 40 years.

—o—

Joseph H. Parsons and **Robert B. Pogue** have been appointed vice presidents, and **Rosser L. Wilson** has been appointed chief engineer of the Brake Shoe & Castings Division, American Brake Shoe Co., New York. Mr. Parsons, formerly assistant vice president, will be in charge of miscellaneous castings sales. Mr. Pogue, formerly chief engineer, continues in charge of engineering. Mr. Wilson was formerly assistant chief engineer.

—o—

Paul F. Zerkle, sales manager, Michigan Tool Co., Detroit, left for Europe Aug. 12. He will spend two months visiting industrial plants in England, France, Western Germany, Sweden, Holland and Italy to assist foreign industries in connection with



ROBERT L. CRAIG

their gear production problems. He can be reached in Europe through Michigan Tool Co.'s representatives.

—o—

Robert L. Craig, for 15 months supervisor of apprentice training in the Youngstown district of Youngstown Sheet & Tube Co., has been appointed supervisor of employment for the company's Youngstown area, succeeding the late **Carl M. Ott.**

—o—

G. Rider Neff has resigned as vice president in charge of sales, Cleveland Cap Screw Co., Cleveland, effective Oct. 1. He assumed the position of sales manager in 1944 after having been associated with Lamson & Sessions Co., Cleveland, for 15 years.

—o—

Harold F. Welch has resigned as machinery manager of the New York office of Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn. He joined Niles-Bement-Pond in 1910 following graduation from Cornell University. Mr. Welch is succeeded by **Isham Keith,** who has been with the organization 20 years in sales engineering work in the New York territory as well as in Rochester, N. Y., and Milwaukee districts.

—o—

E. M. Helwig, for the last 18 years director of purchases, Burroughs Adding Machine Co., Detroit, and active with that company for 40 years, is retiring but will continue to be available to the company's contract division.

—o—

Henry B. Buese has resigned as purchasing agent of North American Philips Co. Inc., Dobbs Ferry, N. Y.

—o—

W. C. Rowland has been appointed manager, Manufacturing & Repair Division, Westinghouse Electric Corp., Pittsburgh. His appointment was made because of illness and approaching retirement of **H. F. Boe,** vice president, who has headed the manufacturing and repair activities since 1938. **Henry N. Muller Jr.,** manager of the educational department, and **J. C. Fink,** manager of the industry engineering department, have been named assistants to the vice president in charge of engineering. Mr. Muller will continue to direct the educational department.

—o—

Dr. Morris A. Steinberg has been elected to the board of directors, Horizons Inc., Princeton, N. J.

—o—

Walter F. Nicoden has been appointed assistant general superintendent of the Youngstown district works of Carnegie-Illinois Steel Corp., U. S. Steel Corp. subsidiary. He had been assistant general superintendent of the company's Edgar Thomson Works in North Braddock, Pa., and will be succeeded there by **Edward J. Parsons,** superintendent of steel production at Youngstown.

—o—

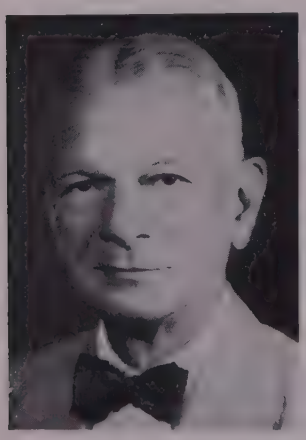
Perfection Stove Co., Cleveland, has appointed **Herbert C. Erhard** as sales manager for its new Oriole and Acorn gas range divisions. He has been associated for more than 25 years with Standard Gas Equipment Corp., Baltimore, former manufacturer of Acorn and Oriole lines.

—o—

R. E. Burroughs has been appointed manager of engineering, Aircraft Gas Turbine Division, General Electric Co., Schenectady, N. Y., where he has been assistant to the manager. He succeeds **H. D. Kelsey,** appointed administrative assistant to the manager of the Turbine Divisions.

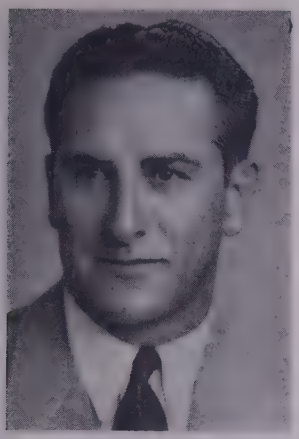
—o—

John Gammell, sales representative in the Philadelphia district office of Allis-Chalmers Mfg. Co., has been

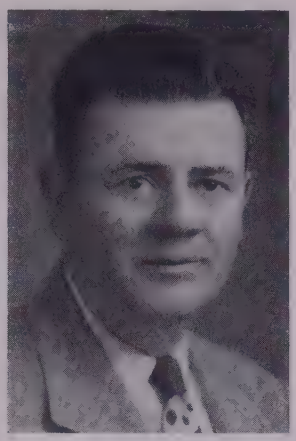


JOSEPH H. PARSONS

ROBERT B. POGUE



THOMAS E. NOLAN



FRANCIS S. SOWERSBY

transferred to Milwaukee as supervisor of sales training.

—o—

Thomas E. Nolan has been elected vice president in charge of production for Blair Strip Steel Co., New Castle, Pa., and **Francis S. Sowersby** has been elected treasurer.

—o—

S. B. Withington, newly elected vice president of Avco Mfg. Corp., New York, has been named general manager of the Lycoming-Spencer Division, recently formed to integrate into a single operating unit the Lycoming and the Spencer Heater Divisions at Williamsport, Pa. Mr. Withington was formerly general manager of the Republic Aircraft Products Division of the company in Detroit. He took over supervision of the Lycoming and Spencer Heater Divisions in 1948. He had served as vice president and a director of Ordnance Steel Foundry and general manufacturing manager of Campbell, Wyant & Cannon Inc. He also served as vice president of J. I. Case Co., and was associated with General Motors Corp. and Ford Motor Co.

—o—

Edgar E. Brosius Co. Inc., Pittsburgh, announces appointment of **John C. Murray** as general sales manager. He will make his headquarters at the company's plant in Sharpsburg, Pa. Mr. Murray had recently been affiliated with Republic Steel Corp. in Youngstown. He previously spent 33 years with Jones & Laughlin Steel Corp., Pittsburgh, as assistant general superintendent of the Pittsburgh Works.

—o—

Glenn H. Cummings and **Nat W. Hopkins** have become partners in a new Detroit advertising and public relations agency under the name of Cummings & Hopkins. Both principals are former newspaper men who have been in advertising and public relations work for many years.

—o—

W. M. Hall, formerly assistant general manager of sales, Wheeling Steel Corp., Wheeling, W. Va., succeeds **N. C. Reed** as general manager of sales. Mr. Reed was appointed vice president in charge of sales.

—o—

Chase Brass & Copper Co., Waterbury, Conn., announces three changes in supervisory personnel for its Metal Works Division: **Paul C. Mulkern** has been named head of the standards department, succeeding **Thomas M. Rianhard,** who was named superintendent of the sheet mill. **Patrick J. Whiston** has been appointed technical consultant for the sheet mill.

OBITUARIES...

W. Emmett Bittner, 52, vice president of purchases for Diamond Alkali Co., Cleveland, died Sept. 2, following an operation. While his home was in Pittsburgh, Mr. Bittner's office had been located in Cleveland since the company transferred its general headquarters there. Mr. Bittner spent his entire business career with Diamond Alkali which he joined in 1916.

—o—

Philip K. Condict, 68, formerly president, International Standard Electric Corp., New York, manufacturing associate of International Telephone & Telegraph Corp. of which he was also a vice president and director, died Sept. 1 at his summer home in South Strafford, Vt., after a brief illness.

—o—

Joseph W. Spradley, 48, sales manager and secretary for M. & H. Valve Co., Anniston, Ala., died Aug. 28 at his home there.

—o—

William G. Conant, 47, head of the metallurgical development section of the Schenectady, N. Y., works laboratory of General Electric Co., died Aug. 29 at his summer home on Sacandaga Reservoir, N. Y. Mr. Conant was a pioneer in the use of x-ray for industrial purposes, and was recognized as an authority on high-temperature alloy steels. He was the author of a number of technical articles on that subject.

—o—

Charles W. Krug, 73, vice president of Aluminum Specialty Co., with plants in Chilton, Wis., and Manitowoc, Wis., died Aug. 28 in Chicago. He was connected with the aluminum industry for 40 years.

—o—

Thomas J. Wilkerson, 80, consulting engineer and former bridge designer for American Bridge Co. and the city of Pittsburgh, died Sept. 2 at his home in Beaver Falls, Pa.

—o—

Gustav A. Sproedt, 62, president, Builders Sheet Metal Works Inc., New York, for the last 20 years, died Sept. 2.

—o—

Samuel P. Bricker, 82, retired vice president and general manager of National Metal Products Co., Pittsburgh, died at his home in Ingomar, Pa., Aug. 28.

—o—

Frederick J. Knobel, 54, assistant treasurer of Doehler-Jarvis Corp., New York, died Aug. 23. He joined the company in 1919.

—o—

William J. Brenner, 69, first president and one of the founders of Lakeview Forge Co., Erie, Pa., died Aug. 30 following a long illness.

—o—

Nathan Block, 73, owner of N. Block & Co., Norfolk, Va., scrap iron and steel dealer, died Sept. 1.

—o—

Homer D. Heman, 73, who joined Ajax Mfg. Co., Cleveland, in 1901, died Sept. 3. When he retired in 1948 he was vice president of the company, and he also had served as general manager of the firm.

—o—

Aaron Rosen, 52, vice president of Buffalo Sash Weight & Foundry Co. Inc., Buffalo, died Aug. 25.

Trabon

Saved $22,000 Here in 12 Months . . . .

A leading steel manufacturer in the Pittsburgh area has released figures on savings obtained through the use of a Trabon centralized grease system on blooming mill tables.

Result: $22,000 saved in one year! The total savings in bearing replacements alone was over $1,500 per month; the balance represented savings in manpower and lubricants.

These exclusive Trabon features made this saving possible:

SEALED — From pump to bearing — keeps out dirt and other harmful foreign matter. Operates efficiently under all conditions.

POSITIVE — Each bearing gets a measured amount — no waste of grease.

HYDRAULIC — Feeder measuring pistons are positively actuated. (Handles oil or grease.)

SINGLE INDICATOR — Gives positive assurance that all points are lubricated.

The men who operate and maintain equipment insist on Trabon — they appreciate the protection it affords men and equipment and the better job of lubrication that results.

Whether your plant is large or small, Trabon has the solution to your lubricating problems. Call or write today.

LUBRICATION SERVICE TO INDUSTRY SINCE 1930!

Trabon

OIL AND GREASE SYSTEMS

WRITE FOR YOUR FREE COPY OF BULLETIN 484

TRABON ENGINEERING CORPORATION

1814 East 40th Street • Cleveland 3, Ohio

Engineering News . . . AT A GLANCE

PUSHBUTTON "ACTION"— Special pushbutton drive and control equipment developed by General Electric is enabling Potash Co. of America, Carlsbad, N. Mex., to raise and dump 8 tons of ore per minute automatically from 1150 feet below the ground. The hoist, driven by two 500-horsepower motors, alternately sends two skips down the vertical shaft, waits long enough for one to be filled by a gravity chute, and starts upward with its load. Although hoisting speed is 1500 feet per minute, the system automatically decelerates the hoist as the buckets approach either end of the lift to prevent overtraveling.

ALUMINUM FOIL MILLS FOR FRANCE— Two complete rolling mill installations and auxiliary equipment for making aluminum foil in France are currently being built by Hydropress Inc., New York. Earmarked for two leading French concerns, Etablissements Charles Coquillard, Froges, and Trefileries et Laminoirs du Harve, Paris, the equipment is designed to roll foil in coils weighing approximately 3000 pounds each. Plants will consist of two 4-high and two 2-high, high-speed mills operating at 3000 feet per minute. They will produce about 10 million pounds of aluminum foil per year. Strip for processing will be supplied by a newly installed continuous strip mill in Issoire, France.

INITIAL TENSION— Number of coils in a spring ordinarily does not affect, or have any relationship to amount of initial tension, according to *The Mainspring* published by Associated Spring Corp. An exception is a spring so long that its weight is heavy enough to overcome initial tension and cause deflection to take place. Initial tension can be wound into cold-coiled extension springs using a hardened or pretempered wire only. Hot-wound springs, and those of soft or annealed materials, cannot be wound with initial tension in the coils. Amount of tension that may be readily wound into extension springs using standard automatic spring coiling machines may be estimated as 25 to 33 per cent of the maximum load that a spring can safely support.

ONE-MACHINE PRODUCTION LINE— Devices that automatically move parts from one operation to the next enable the latest special machine tool for engine blocks, developed by Cross Co., Detroit, to perform 45 individual finishing operations with only one unskilled operator in attendance. The company reports the machine rough bores seven crankshaft and four camshaft bearings, drills completely the oil gallery hole. It also drills 21 holes in the front face of each block, ten holes in the rear face and reams two locating holes in the rear face. All of the operations are done at a rate that enables the machine to produce 35 cylinder blocks each hour. Seven stations are included in the machine—a loading, five working and intermediate stations.

HIGH IMPACT RESISTOR— A new phenolic laminate material that can be machined to fine finishes is reported by Synthane Corp., Oaks, Pa. In tests, consisting of dropping a 1-pound weight from a height of 1 foot at the rate of 40 blows per minute on a notched impact specimen, the material resists as many as 5000 blows. Properties stem from use of a cotton mat filler in which random fibers lie in all directions rather than in parallel planes. Currently the material is being produced in form of sheets.

ALL CONDITION "LUBES" — One enterprise that requires lubricants that can "take it" is the iron and steel industry. To "service" it, oil companies must refine and compound products that function dependably under most intensive conditions of heat and pressure while subjected to contamination from scale, salt, dirt and water. Although the massive units employed at first glance leads to the belief that lubrication is not a serious matter, this is far from the truth. The equipment is so interdependent that operation mechanisms of these various units must be accurately designed and machined. That also means many rubbing and moving parts must be lubricated adequately for instant motion regardless of surrounding conditions. (p.106)

REVEALS THE UNSEEN—Today, in the many instances of production to minute dimensional limits, quality control can best be achieved by the optical projection comparator. In some instances where contours are involved, it is the only practical method for seeing and measuring "split thousandths". The technique, in combination with specially designed staging fixtures, rapidly checks tolerances as fine as 0.0001-inch. It can be used for inspecting transmission drives, automobile shift levers; contour, pitch and centered distances of chain links, watch parts, dovetail roots on jet and turbine blades and various component parts where limit tolerances are critical. (p.110)

MONUMENT OF THE AGE — The iron blast furnace, in the words of Buford M. Stubblefield, Youngstown Sheet & Tube's Chicago district manager, is truly a working monument to our present advanced state of metalworking. Importance of its product, pig iron, in our economy cannot be over emphasized. Pig iron is not only used as a finished product in a large casting industry, but it also provides raw material for the entire steel industry. As of last January, annual capacity of United States blast furnaces stood at an all time peak of 66,341,930 tons. Improvements in equipment, intelligent handling of operations today enable individual furnaces to produce as high as 1700 tons of iron per day. (p.128)

Prescribed

LUBRICATION of steel rolling mill machinery is always a popular topic. It permits discussion of centralized grease lubricating systems, of oil film bearings and the chemistry of lubrication. For this service, lubricants must be refined, compounded and protected so that they will function dependably under the most intensive conditions of heat and pressure, all the while subject to contamination from scale, salt, dirt and water.

Invention of the bessemer converter in 1856 marked the beginning of the steel age. Iron had figured prominently throughout world history as the outstanding metal in the advancement of civilization. It sufficed until the world callously demanded volume. The blast furnace, the bessemer converter, the open-hearth furnace and rolling mill solved our problems of maximum production with low cost.

Chemistry of iron and steel then became a science, and the formulation of alloys with such elements as carbon, silicon, nickel, chromium, tungsten, vanadium, phosphorus and manganese, made possible the variable degrees of hardness, ductility and strength so necessary today.

Chemistry and metallography, however, can determine only the nature of the product. They cannot govern rate of production of the mechanical equipment involved. That is an operational problem which is very often dependent to a great extent upon lubrication. The science of lubrication, therefore, must be considered. Intensive operating conditions in iron and steel plants call for a minimum of friction, and uniformity of bearing temperatures in the face of the most discouraging operating conditions. Hot water, acid fumes, salt, dirt, dust, etc., are examples of the objectional factors confronting the lubrication engineer.

Specific Equipment Involved—Three distinct phases of operation are required in the smelting and refining of iron ores and scrap, for the purpose of converting them into workable grades of steel. Each involves its specific equipment. For example: Smelting, which requires such equipment as the blast furnace with its hoist and materials handling equipment; storage or mixing, wherein the mixer is involved; and refining, or converting of iron into steel involving either the bessemer converter, the open hearth, or the electric furnace.

A vast amount of soft coal is required to make the coke which goes into a blast furnace charge. Consequently, an expansive storage yard is required with machinery for moving the coal and grading it to size for the coke ovens. Small cars moved by an endless cable can be used effectually in the coal yard. Each car has a grip device which automatically fastens to

Fig. 1—View of blast furnace large bell beam showshowing method of grouping lubricant measuring valves on fulcrum top with flexible outlet connections to the link pin bearings. Note pressure control valve on stack at left. When sufficient pressure is developed to operate this valve, it makes contact which lights a signal at the central pumping unit in the hoist room below. Courtesy Farval Corp.

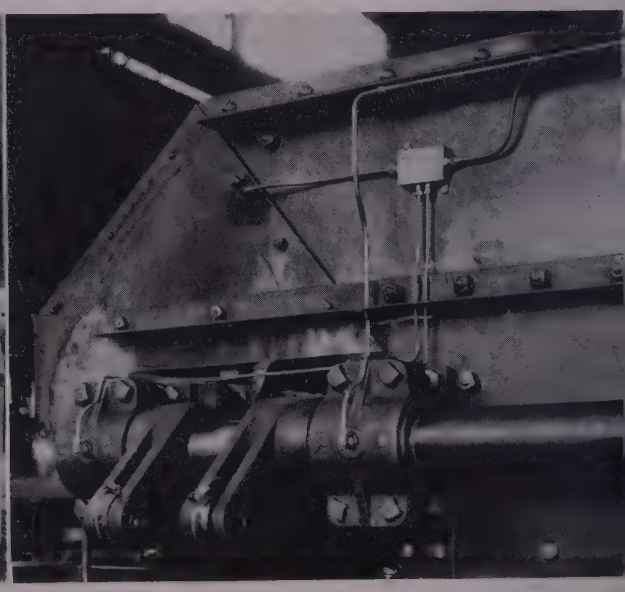


Fig. 2—Transfer car side where reversible type feeders are used to lubricate line shaft points and linkage. Courtesy Trabon Engineering Corp.

Lubrication

For Iron and Steelmaking Equipment

By A. F. BREWER
Technical & Research Division
The Texas Co.
New York

Lubrication of machinery in the iron and steel industry, prior to rolling, is not so glamorous a topic. It is a dirty job, often involving exposure of lubricants to the elements. There is a definite trend, however, toward centralized lubrication to improve conditions

the moving cable. This cable is not lubricated, so that a firm grip is assured. The cable sheaves must be lubricated, however, also the car wheel bearings, as well as the bearings and gears on the driving machinery and the eccentrics and bearings of the screens and grinding machines. These parts are greased by pressure gun, or bath lubricated as in the case of gears. The chief problem is to use enough grease, often enough, to keep coal dust from working into the bearing clearances.

Coke for blast furnace use must have high compressive strength so that it can properly support the furnace charge and enable proper passage of combustion gases. This compressive strength is attained in part from the nature of the coking process, in part from the type of coal used, and in part by charging a light-medium viscosity petroleum oil into the coke ovens with the coal.

Air is the most voluminous material used in the iron and steel industry. Approximately 4 to 6 tons of air are used to make each ton of pig iron. In the blast furnace this air furnishes oxygen for the combustion process; in the bessemer converter it provides the oxidizing effect. Though required in large volume, this air is used at a relatively low pressure, which is developed by turboblowers or huge horizontal or vertical compressors known as blowing engines, the air cylinders of which are called tubs. Average pressure is from 15 to 30 pounds.

Quality Turbine Oil Required—These turboblowers are steam driven and in the modern plant their bearings are protected by an oil circulating system with all the necessary control valves, filtration and storage tanks which prevail in a modern turbine plant. Consequently a high quality turbine oil having rust and oxidation resistant properties is used. This must be capable of protecting the labyrinth packing exposed to the high surface speed.

The blowing engines, however, are run on blast furnace gas or steam. They are slow speed—around 60 rpm. An interesting problem relating the Btu content of the gas to lubrication prevails. If this gas is too high in Btu value, it may cause backfiring in the blower engine. This creates a heat condition so intense as to burn away the lubricating oil on the engine cylinder walls. If an average Btu value of 90 to 100 is maintained at the blast furnaces, however, there is little chance of backfiring. To protect the engine cylinders and rings this gas is cleaned and washed of flue dust particles before usage.

Air tub operation is exceedingly important due to the fact that pressure must be kept on the lines to the blast furnaces and bessemer converters at all times. As cleaning is practically impossible, the blower cylinder lubricant must be so refined as to give the minimum of carbonaceous accumulations in the air system. This can be promoted by insuring against feeding oil in excessive quantities to the air cylinders. Excess oil never improves lubrication and only leads to objectionable deposits, although since air tub pressures usually don't exceed 30 pounds cylinder temperatures never run much above 300° F.

Load and Dirt Are Major Problems—Parts to be lubricated around the blast furnace itself are confined to the wire rope, bull wheels, sheaves, the large and small bell beams, gears and bearings of the skip hoist, unless the furnace is of the McKee type and fitted with a revolving top. This top requires lubrication of the worm gear driving unit and the bearings of the rolls upon which the top is turned. The former is a self-contained unit and lubricated by a worm gear lubricant of from 150 to 175 seconds Saybolt Universal Viscosity at 210° F. The roll bearings are most safely served by a centralized greasing system using a lime soap grease usually of National Lubricating Grease Institute No. 1 or No. 2 grade. Load and dirt are the chief problems, although considerable temperature variation may be encountered in northern parts of the country.

In addition to lubrication on a McKee top furnace, a petroleum grease also is used to lubricate the packing gland and thus effectually seal the gas and prevent excessive leakage between the revolving top and the shell. Blast furnace gas escapes when the sealing gland becomes hardened due to temperature and lack of lubrication.

As already stated, blast furnace operation requires huge turboblowers, or reciprocating blowing engines which furnish the necessary low pressure blasts of air to the hot-blast stoves for preheating prior to delivery to the blast furnaces; charging equipment which includes the wire ropes and bearings of the charging lorries and skip hoists, with their respec-

tive driving engines or motors; slag cranes, steam or hydraulic clay guns, ladle cars, storage bin feeders and miscellaneous gearing.

As most of this equipment is kept outdoors, or housed without benefit of heat control, obviously it may operate over a wide range of atmospheric temperatures, or radiated heat from the furnace itself. The blast furnace generates high heats and these are naturally radiated to the surroundings. Fortunately, however, much of the necessary mechanical equipment is not too close to the furnace, although the surrounding atmosphere usually has a high dust content which can cause difficulty in lubricating the blowing engines if the intake air is not filtered.

Bearings in turn can be grouped into two classifications: 1—As involving automatic lubricators, or 2—exposed, hand-oiled conditions.

Black Oil Used to Advantage—Steam engine, pump, turboblower, and electric motor bearings are largely oiled by some automatic though unit-type of lubricator. Those under cover should give little or no trouble. Exposed, hand-oiled bearings as are found on skip buckets and transfer cars, etc., receive rougher service, and dust, dirt and rain are always detrimental factors. Such bearings have fairly high clearances, however, and operate at low speeds and pressures. Black oil can be used here to good advantage.

Gears and wire rope operating under conditions similar to bearings, though at perhaps higher working pressures, require a lubricant which will not drip from their surfaces, which will penetrate to the core of the ropes, and which will adhere tenaciously to the gear teeth in an even film. Normally, a straight mineral gear and rope lubricant from 600 to 2000 seconds Saybolt Universal Viscosity at 210° F is used.

Hot metal, ladle and ingot cars are continually being moved around the yard. Hot metal and ladle cars may function to carry the iron poured from the blast furnace to the mixer or bessemer converter. Ingot cars carry the solidified ingots from the open hearth, to the soaking pits at the blooming mills.

These cars may be equipped with either plain journal boxes and brasses, or roller bearings. The latter have come into quite extensive usage in modern mills due to their savings in labor, inspection and lubricants. While it might seem that such bearings would be subjected to considerable heat, inasmuch as they are practically always in the open air, radiation can occur freely. As a result, such bearings, even before the ingots have solidified, usually will be comfortable to the touch.

Certain types of roller bearings are successfully lubricated by pressure grease application, directed via a drilled hole in the outer face of the journal and leading at a 45 degree angle from the base periphery of the journal where the bearing rolls are in contact.

Careless Handling Often Prevails—Hot metal, slag, dust, dirt and variable loads are often the more important factors which must be considered. All can affect the lubrication of plain journal bearings of the railway type because of rough service and careless handling which so often prevail. In the roller bearing, the housing is tight and no carelessness can so disarrange it as to expose the bearing or lubricant to the detrimental action of hot iron, slag, dust, dirt or water.

Pig iron is kept molten in a mixer, after it has been poured from the blast furnace. This may be necessary when immediate charging into the converters or open hearth is impracticable for any reason. Then iron from the blast furnace is poured into a firebrick-lined ladle which is mounted on a suitable car for transportation to the mixer. This latter is simply a large receptacle of several hundred tons capacity which serves to keep the iron in molten state to

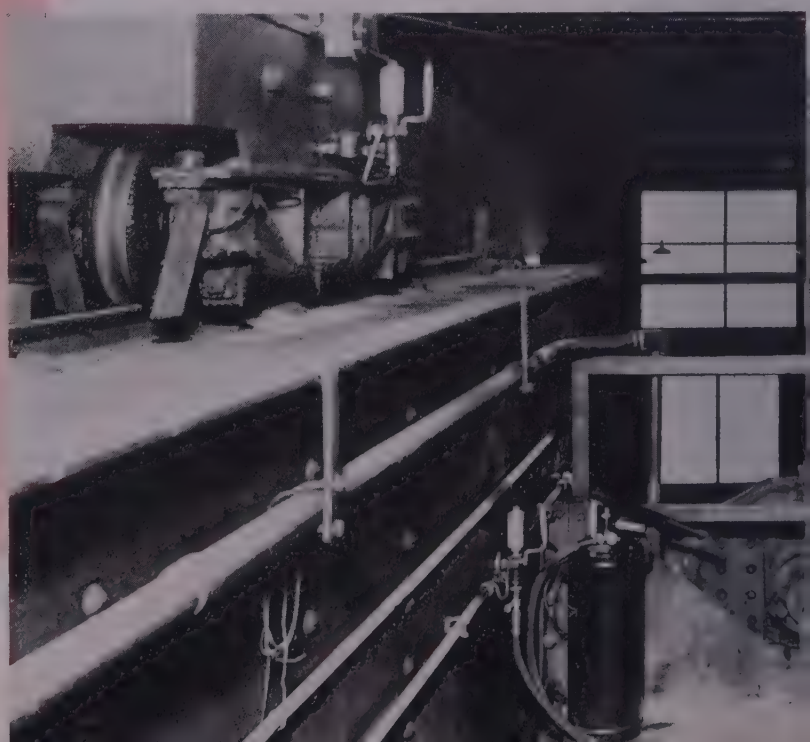


Fig. 3 — Lubricant pump is attached to the reversing valve which actuates flow of lubricant to overhead crane bridge system. Note trolley above bridge with the reversing valve for actuating the trolley systems. Courtesy Alemite Sales Division, Stewart-Warner Corp.

Fig. 4—Centralized lubricating system installed on a 5-ton auxiliary unit of a 25-ton Harnischfeger crane. Courtesy Lincoln Engineering Co.

uniformly mix the products of perhaps several blast furnaces and to desulphurize the metal to a certain extent. While the mixer usually does not heat the iron, it must always, however, be prepared to do so if necessary. Therefore, heating equipment of some sort is essential, depending in extent upon the nature of the fuel at hand.

Even where no extra heat is supplied, the mixer will naturally radiate considerable heat to its surroundings. Furthermore, it imposes a severe load on its rollers and tipping mechanisms when it is rotated for emptying its contents into ladle cars. Careful attention to lubrication is required as a consequence, for bearing and gear lubricants must withstand heat, pressure, dust and contamination by flying sparks. A straight mineral lubricant of from 1000 to 5000 seconds Saybolt Universal Viscosity at 210° F, according to weather and temperature conditions, has been found best suited for the gears. Bearings are usually hand lubricated with the exception of ring oiled motor bearings. The latter require a good grade of medium viscosity engine oil; the other can be protected with black oil.

Conversion of iron to steel is a process of decarbonization and oxidation while the iron is in molten form. Sir Henry Bessemer invented the process which bears his name and announced it in 1856.

Heat Resistant Lubricant Needed—Bessemer converters have to be free to swing readily when charging or pouring. Therefore, the operating mechanism which comprises a pair of hydraulic plungers with suitable racks and pinions adjacent to the trunnions, must work with the least possible friction, otherwise the power consumption and time of turning might be rapidly increased. This holds true regardless of the heat. That is why a lubrication problem is involved, so the lubricant must be heat resisting to the highest degree. A straight mineral product of around 1000 seconds Saybolt Universal Viscosity at 210° F due to its adhesive characteristics has been found to meet the converter's requirements.

The air blast for blowing may be supplied by either horizontal or vertical steam driven blowers or turboblowers. These normally are located in engine rooms apart from the converters, so their lubrication, involving circulating oiling systems or mechanical force feed lubricators is similar to that of any power plant unit.

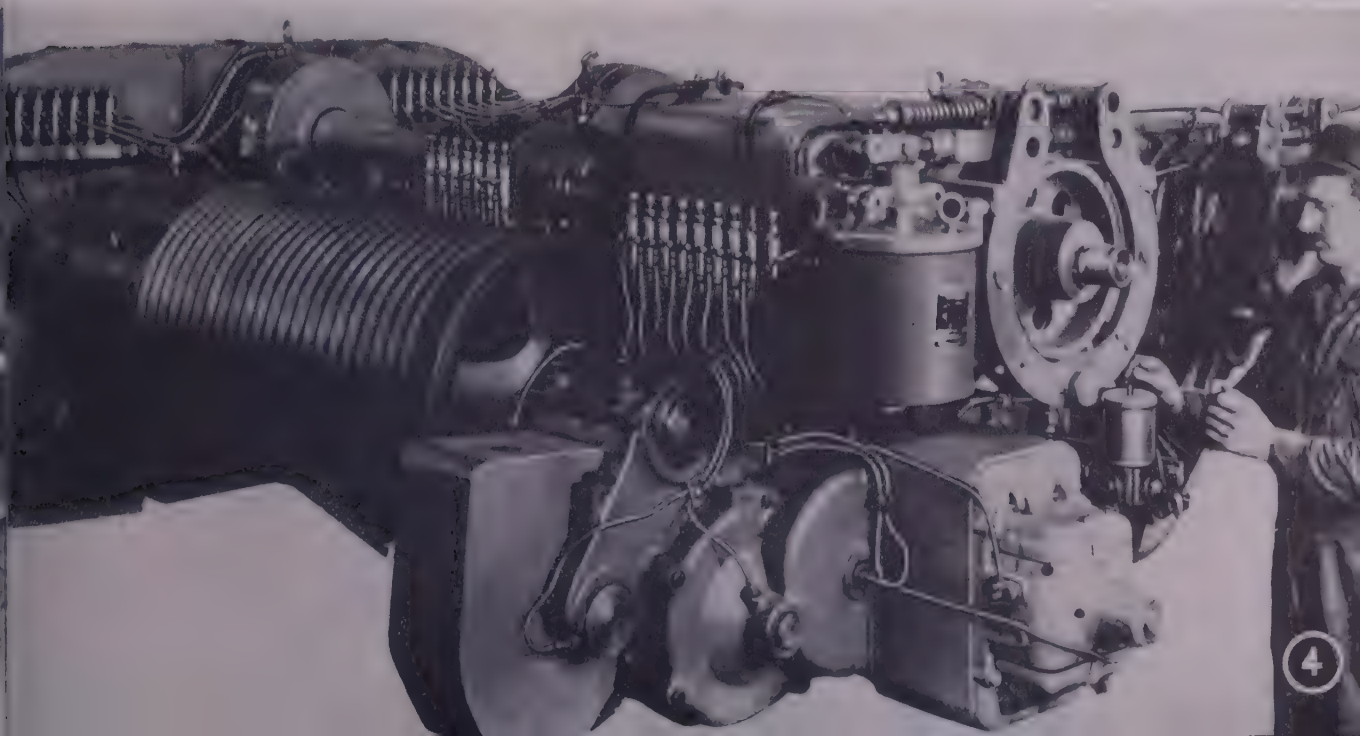
Steel is poured from the bessemers into a ladle for transfer to the ingot molds. The cranes which handle these ladles are motor driven. The presence of heat, slag and dust naturally imposes the same severe requirements upon the lubricant as elsewhere in this part of the plant; as a result lubrication of gears and bearings often becomes quite a serious problem. If the gear lubricant as recommended for converter gears is used, with a good black oil for bearings and journals, many difficulties will be eliminated.

Some ladle cranes are equipped with automatic centralized lubricating systems so controlled that after a predetermined number of lifts, the system automatically cuts in and lubricates the entire crane.

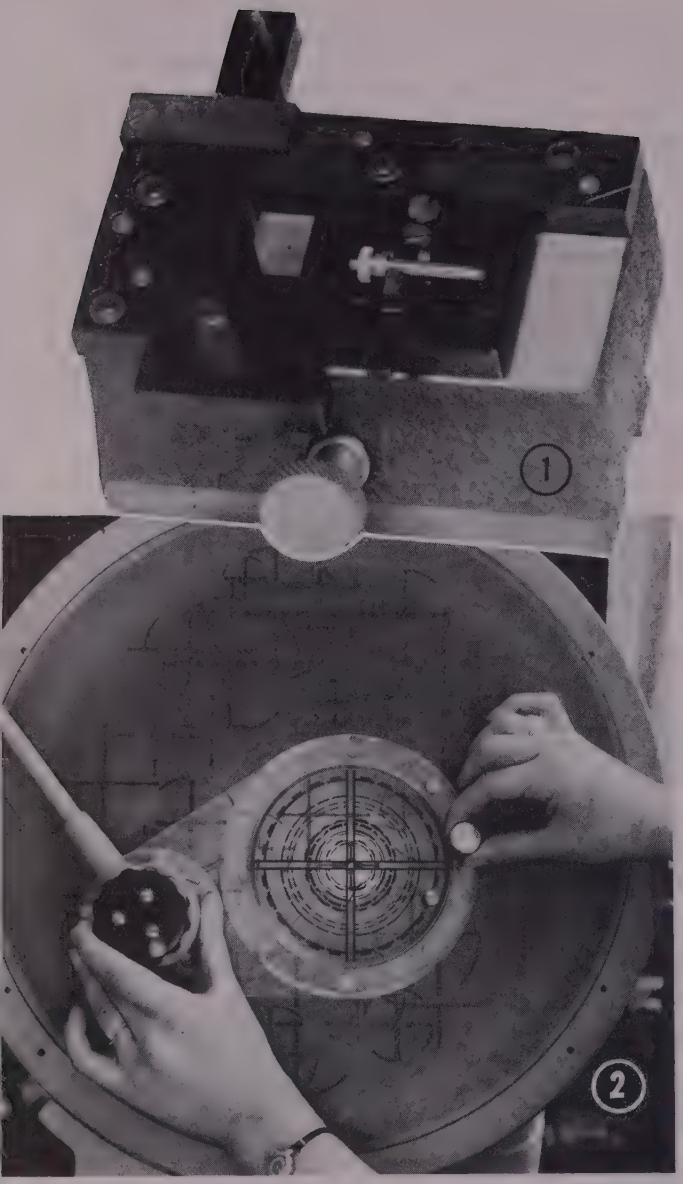
Steels of very definite properties can be produced in the open hearth. This process also takes a larger volume of pig iron and scrap than the bessemer. The necessary heat for melting and refining the iron is obtained from coke oven gas, fuel oil or natural gas. Fuel oil is an important factor in such plants as have limited gas equipment.

Little Lubrication Needed In Open Hearth—With the exception of the charging cranes, overhead traveling cranes, strippers and operating mechanims for raising and lowering the charging doors, the open hearth plant has relatively little machinery requiring lubrication. This equipment is electrically operated. The overhead traveling cranes which handle the metal ladles are the most important hoisting devices involved; they may run as high as 300 tons capacity. All have at least two separate hoists, the smaller or auxiliary being oftentimes as powerful as in the average crane found on other work.

Heat and contamination (*Please turn to page* 146)



CHECKING "SPLI



IMPROVED optical lens systems, better illumination, increased sharpness of image, and freedom from color fringes, fuzziness or distortion over the entire screen area has broadened considerably the utilization of the optical projection comparator, contour measuring projector, or shadowgraph as production tools for accurate time-saving inspection of component parts within critical tolerance limits.

By projecting an accurately magnified shadow, the optical projection comparator provides the means for seeing and measuring "split thousandths." When scientifically co-ordinated staging fixtures and chart-gages are used with the optical inspection unit, more rapid and accurate inspection is possible, as well as fuller utilization of the applications of optical projection in maintaining control of both tooling and production. Experience has proved that in many instances of production to minute dimensional limits, quality control can best be achieved by this method. In some instances where contours are involved, it is the only practical method.

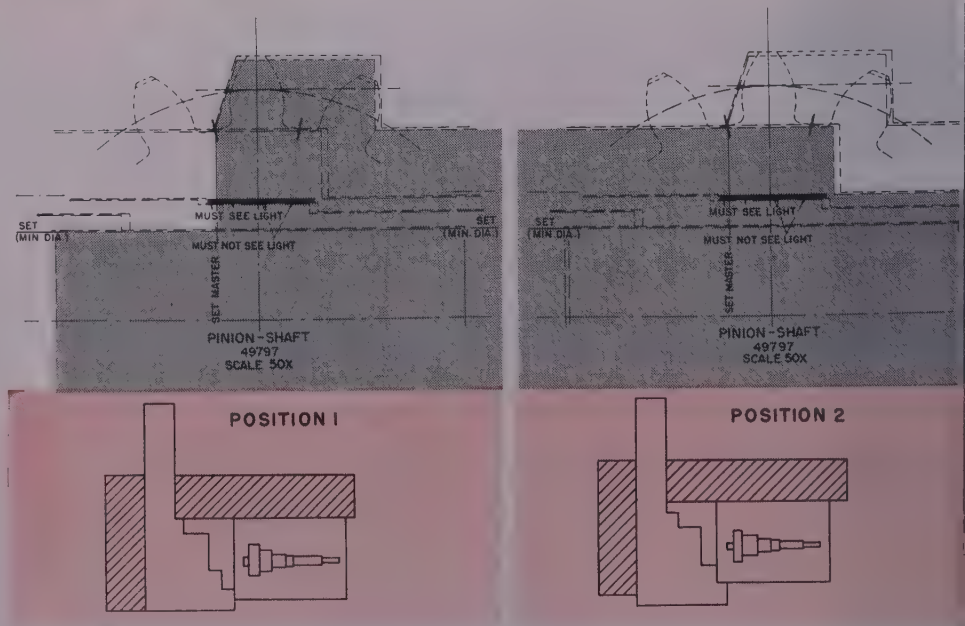
Optical comparators in combination with specially designed staging fixtures recently have been placed in service to rapidly check tolerances as fine as 0.0001-inch. This was heretofore considered impractical because of the lack of accurate image sharpness for 0.0001-inch inspection.

Simple Method—The optical comparator utilizes a simple and practical method by projecting a magnified shadow of a part onto a viewing screen. The

Fig. 1 — Staging fixture used in combination with optical comparator to inspect watch parts

Fig. 2—To check hole size and location, the operator positions overscreen chart until circle of light is centered within bridge tolerance

Fig. 3 — Five positions used to projection-inspect a pinion and integral shaft, with staging fixture shown in Fig 1 and co-ordinated chart-gage



"HOUSANDTHS" ... by optical projection gaging simplifies production control and reduces inspection time

principle applied is to position a part at the focal point between a parallel ray light source on the one side, and an accurate optical system of a known magnification on the opposite side. The shadow profile of the part can be compared to a chart or drawing on the viewing screen to determine if the part is within the maximum and minimum tolerance limits. Example, 0.001-inch magnified 62.5 times equals 1/16-inch on the comparator screen. Split thousandths can be easily and quickly seen and the contour profile of a part visually inspected.

This equipment is being used currently for inspection of transmission drives and automobile shift levers; contour, pitch and centered distances of chain links, watch parts, threads, dovetail roots on jet and turbine blades, metal stampings, small gears, and various component parts where limit tolerances are critical.

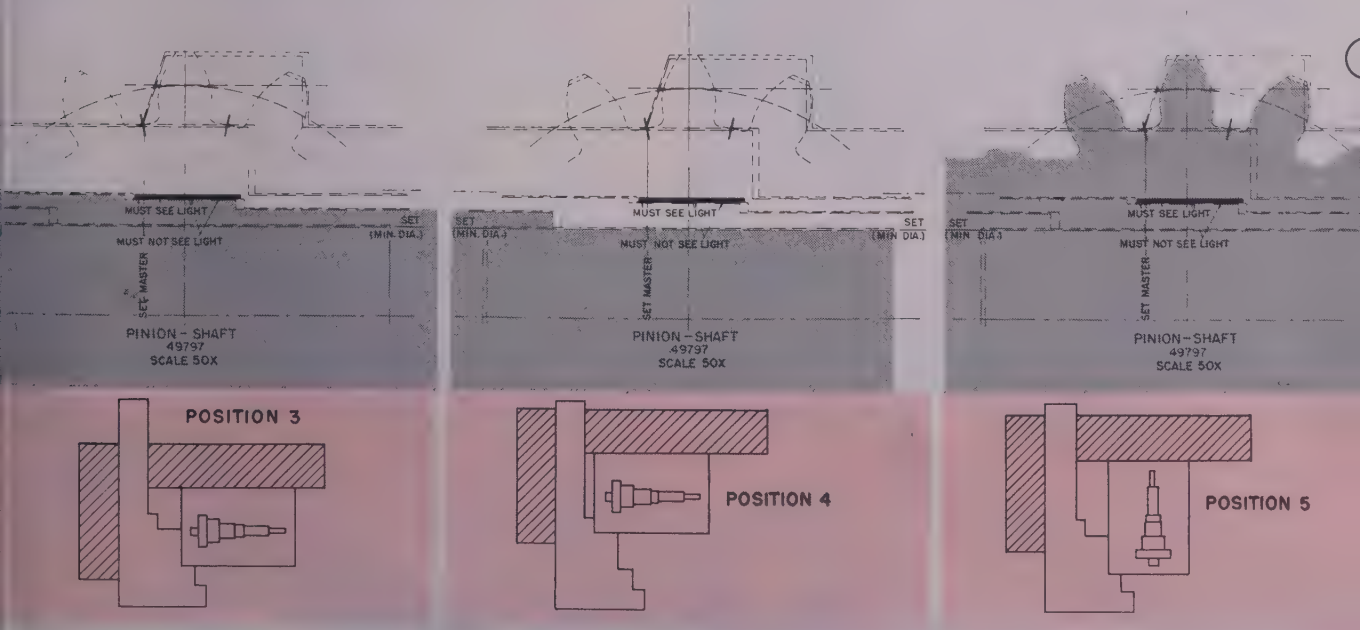
Major advantage cited by manufacturers of the above products is safe and rapid visual inspection rather than feel, often replacing several mechanical gaging operations into one visual operation. Other advantages include reduced or eliminated wear of gages, ability to use less skilled help, reduced tooling and setup time and ease of making alterations.

Fig. 1 shows an American Optical Co. comparator in combination with staging fixture, specially designed by Engineers Specialties Division of Universal Engraving & Colorplate Co. Inc., used for inspection within critical tolerances of 0.0001-inch of watch pillar plates, bridges, and assembly of bridges and pillar plates. Magnification of 62.5 times is used. At this magnification 0.0001-inch is viewed as 0.00625-inch on the screen.

"Bridge" Tolerances—A system of bridge tolerances is used for checking these close tolerances on the chart-gage screen. This method is illustrated in line drawings, Fig. 3, showing inspection of a pinion and integral shaft, positions one through five.

Position 1: Holding unit of the fixture locates pinion shaft horizontally. Sliding stop positions so three diameters, end of shaft, chamfer and width of pinion are checked against chart-gage. 2. Sliding stop pulled out with holding unit moved to second position. Part remains in focal plane, allowing inspection of step and additional diameter. 3. Third stop allows inspection of two diameters and shoulders. Middle diameter held to 0.00025-inch from axis, is checked by "go and no-go" light scale. 4. Fourth stop allows check of shafts' minimum diameter, shoulder at this point and end, or length of shaft. 5. Holding unit is now turned 90 degrees in third stop of slide, for final check of pinion and inspection of three teeth for spacing, thickness and full involute form.

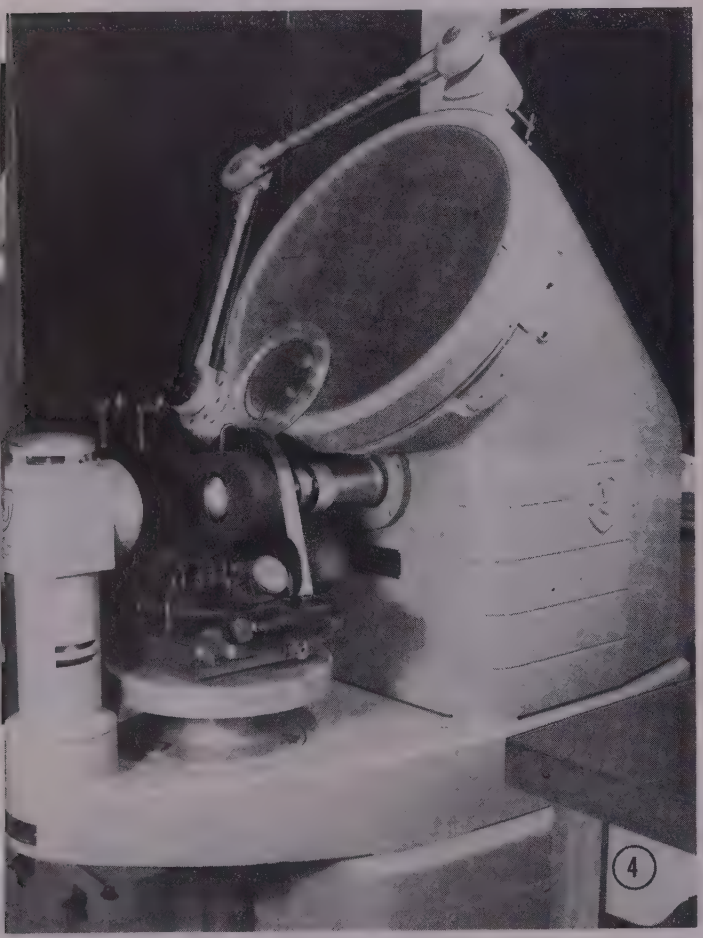
Complete inspection of 18 critical dimensions was obtained on production inspection by the five positions, at rate of 250 per hour under magnification of 50 times. Tolerances: Least 0.0005-inch, greatest plus or minus 0.002-inch.



As in case of the pinion and integral shaft the watch pillar and bridge plate parts were larger than could be projected on the comparator screen at one time, therefore a special staging fixture was built.

Positioning Part—The staging fixture incorporates a preloaded, ball-bearing member on which the part is positioned by locking on two locating pins. The member moves freely in the horizontal and vertical planes. This permits moving the part in the front of the 62.5 times magnification lens to enable the holes within various areas to be projected on the screen.

A series of 24 pins are incorporated in the fixture and are adjustable, 12 for horizontal settings and 12 for vertical settings. These settings are to Jo-block measurements and correspond to the amount of horizontal and vertical movement of the part required to project the various areas.



A pin fastened to the preloaded ball-bearing member is on the top of the vertical pin and against the horizontal pin. This established the X and Y relationship of the pillar plate while various holes are being projected on the screen. The pins are indexed horizontally as areas of the part are to be checked.

Precision Screen—The chart-gage screen is precision made and co-ordinated with the X and Y movements of the pillar plate as positioned by the pin settings. The large chart-gage screen with its plus bridge tolerances are in relationship to the holes as they will appear on the screen.

The overscreen chart is fastened in a plexiglass adapter and fastened to a drafting machine arm for convenience of the operator. This chart consists of a series of bridge tolerance circles in the center of which are two paralled black bands running horizontally and vertically.

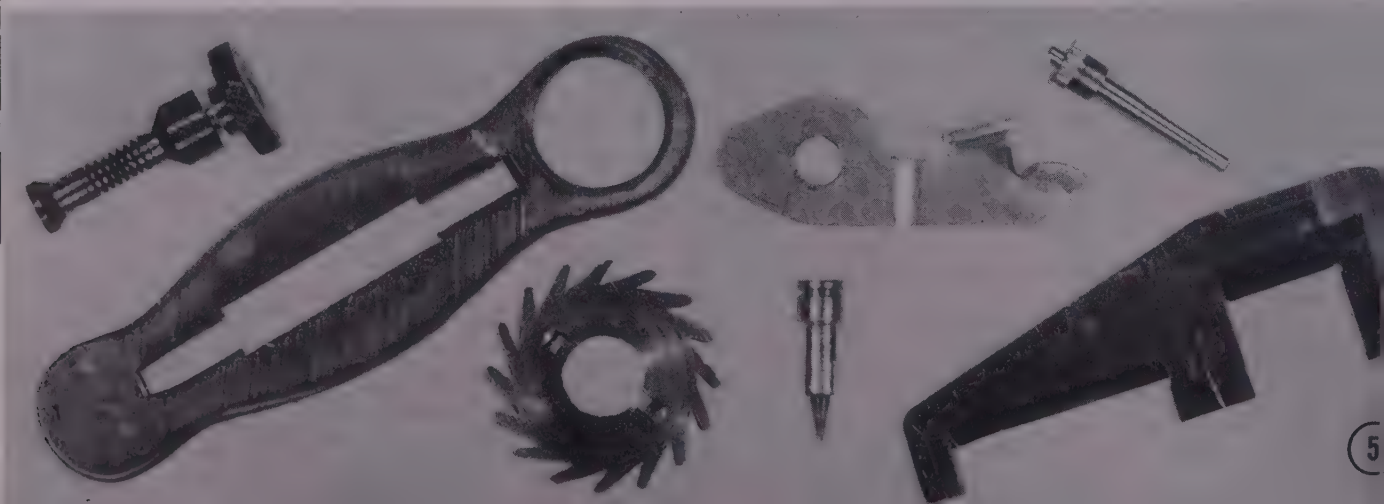
To check hole size and location, Fig. 2, the operator positions the overscreen chart until circle of light is centered within bridge tolerance. When this is centered, the plus bridge of the chart-gage screen must be within the two parallel bands horizontally and vertically of the overscreen chart. Fig. 3 shows this as within tolerances. If hole center spacing is not within tolerances, light will be seen between the bottom of the "bridge" and the two parallel bands either horizontally or vertically.

Accuracy Important—Accuracy of optical lens system and sharpness of image on the optical comparator, the staging fixture, and co-ordinated chart-gage screen are of utmost importance. Either one without the other would result in inaccurate gaging. Considerable interest also has recently developed in surface projection, as opposed to shadow projection, for inspecting blind holes, dies, and other parts whose contours do not permit inspection either by shadowgraph or by conventional mechanical gaging.

A contour projector has been designed with this in view, utilizing a unique optical system which directs parallel light through the front lens of the comparator on to the surface to be inspected and the image is reflected back through same lens on to screen.

Fig. 4—Optical comparator and staging fixture

Fig. 5—Examples of products currently inspected by optical projection



SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

ECONOMICAL TUBE CUTTING: For many years the late Dr. Russell Conwell was noted for his lecture "Acres of Diamonds." It was the story of a man who traveled far and wide seeking what eventually was found right in his own dooryard. Profiting by that lecture, my friends in the machine tool industry never allow me to forget that there are no less than 15 machine tool plants right here in Cleveland.

Thus it came about, a few days ago, that my good neighbor Oskar Kylin, vice president and chief engineer, Bardons & Oliver Inc., invited me over to his plant to witness a demonstration of a new machine designed primarily for production of pipe nipples. Like Dr. Conwell's character, I have at times traveled far to witness demonstrations of far less significance than this one which I witnessed at 1133 W. Ninth St.—which is only five minutes' walk from my office.

The machine which Oskar Kylin demonstrated to me belongs to the single spindle, heavy duty, high speed "bar feed" lathe family, but it is designed from the floor up for the primary purpose of chamfering and cutting off pipe and tubing from ⅜ to 2 inches OD. On the day of my visit it was tooled up for automatic production of blanks for commercial ¼-inch pipe nipples—and it was "knocking them off" at the rate of more than 90 per minute, chamfered and ready for threading.

Two things interested me particularly. One was the unique method of cutting off which eliminates the 3/32-inch kerf which would have to be taken with a conventional parting tool. The other was the adjustable roller feed which advances the pipe or tubing in the almost imperceptible period between cuts.

Instead of the usual narrow blade which removes metal in the form of chips—thereby losing a fraction of an inch in useful tubing length at every cut—Mr. Kylin employs a sharp-edged disk as a parting tool. After chamfering has been accomplished from the rear with a conventional tool, this disk—which may be from 5½ to 7 inches in diameter—moves in from the front, rolls momentarily with the work and "incises" it off without chip formation.

Except for its larger diameter, this unique parting tool reminds me of the sharp steel wheel used in a glass cutter. I believe that it will be profitably applied to many things other than pipe nipples, now that tubing is replacing solid bar stock for many production parts. By the end of the day the saving in tubing effected by this "incising" technique mounts up to a surprising figure. This is one more good example of the current trend toward getting more metal into the work and less into the chip pan.

The roller stock feed used on this machine in turn is a good example of the efforts now being made by machine tool builders to have materials handling keep pace with high speed cutting. Driven by a separate motor and timed in with the automatic cycle, this mechanism will roll forward predetermined lengths of tubing ranging from ¼ to 12 inches in a brief interval following retraction of the cam-operated cutting tools, opening of the collet and its closing.

Just how brief that interval is can be deduced from the fact that on the demonstration which I witnessed on production of ¼-inch nipples, the entire cycle involved less than 0.66 second per piece—the feed consuming only a fractional part of that time. Machine tool users today are no more willing to waste fractions of seconds in production time than they are to waste fractions of inches of material. Mr. Kylin had those facts in mind when he designed this machine.

HANDBOOK ON CUTTING TOOLS: Since the end of the war there has been increasing evidence of a new conception of the duties of trade and business associations. These associations are doing more and more in the way of education—not only of their own members but also of workers who use the products made by their members and the general public which profits by this use.

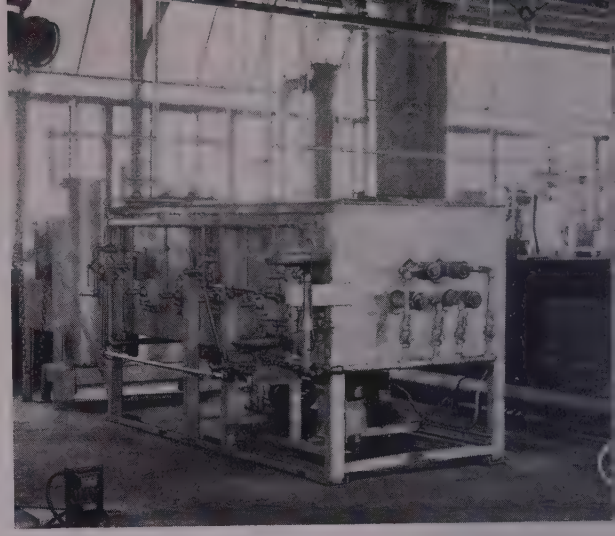
Mason Britton, president, Metal Cutting Tool Institute, Chrysler Bldg., New York 17, now calls my attention to a big and important educational project just completed by the institute on selection, operation and maintenance of all kinds of modern metal cutting tools. After several years of intensive effort supported by and contributed to by all the members of the institute, this educational project finally has been "rolled up and packaged" in the form of a textbook—the like of which I never before have seen.

In his letter to me, Mason Britton explains that this 647-page *Metal Cutting Tool Handbook* was authored jointly by institute committees of engineers specializing respectively on drills, reamers and counterbores, taps and dies, milling cutters, gear hobs and gear cutters and broaches. He makes the forthright statement that this is the first large caliber textbook devoted entirely to metal cutting tools. After studying through my presentation copy from cover to cover, I am strongly inclined to agree with him.

In my opinion, the Metal Cutting Tool Institute has made a contribution to the literature of modern machine shop practice which deserves the attention of the entire metalworking industry. There is no question in my mind but that tremendous savings can be effected throughout industry through more thoughtful selection, more efficient use and more scientific sharpening of all kinds of cutting tools.

As tool costs are brought down through such attention to those factors, volume and quality of work turned out by machine tools will at the same time go up. Study of this book will do a lot towards bringing about that highly desirable sequence of events in these days of stiffening competition in the manufacture of all kinds of metal products.

Formation of CG gas, carbon deposition within the muffle, dry cyaniding, use of oil instead of gas as a source of hydrocarbon, control of carburizing atmosphere, are some of the subjects treated in the second and final part of this timely article



By R. J. COWAN
Metallurgical Consultant
Cleveland

Continuous Gas Carburizing

AS ONE looks back over the history of this development, he wonders why the gases were not introduced in the hot carburizing zone of the muffle when using these higher hydrocarbons, rather than along with the cold work at the entrance of the muffle. At a later date a number of top inlets were provided for better gas distribution, but it seems that this did not occur to anyone at that time as a way to overcome carbon scale formation.

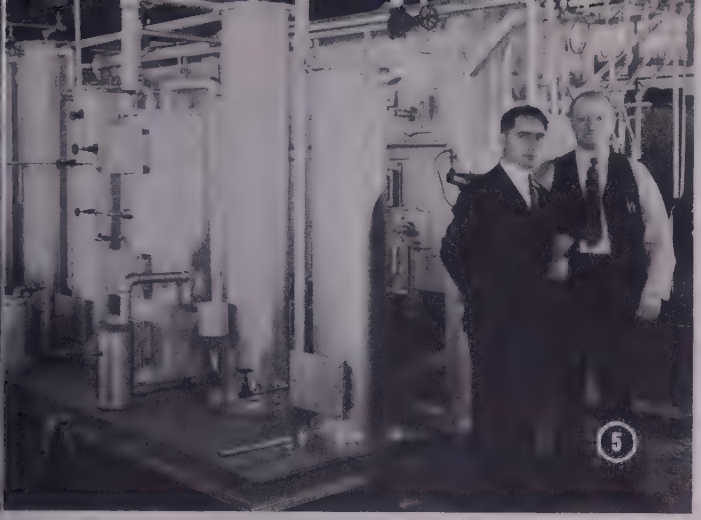
Presence of unsaturated hydrocarbons in the high temperature carburizing zone was found to provide a highly effective carburizing medium, as was shown later when using the decomposition products of oil for carburizing. Furthermore, the introduction of the carburizing gas mixture of higher hydrocarbons into the high temperature zone would have retained the original concept of the mechanism of the reaction, since, in this case, oxidation and soot deposition would still have occurred in the heating zone, and tar would not have formed in the high temperature zone.

In this way the two reactions would have been separated from each other and the normal reactions have occurred with the added advantage of accelerated carburizing by the presence of higher hydrocarbons in the carburizing zone. Also, the particular effectiveness of carbon monoxide at the metal surface would have made the continued use of flue gas with its carbon dioxide content highly desirable.

However, in the early days of 1933 these facts were not known and the development took on a different turn. While working with a single gas inlet at the front end of the muffle, an effort was made to provide a type of diluent gas that would replace flue gas and serve to counteract the formation of tar in the heating zone of the muffle.

It was known that a gas which was comparatively high in hydrogen content would do this. Accordingly, such a gas was developed and this was used as a diluent along with propane or butane in those installations where these were the source of hydrocarbon. In the laboratory notebooks of that period this diluent became known as "CG", which is a kind of hieroglyphic for cracked gas. Throughout the industry this later became known as "CG gas".

Formation of CG Gas—Principle of the formation of CG gas is as follows: When a mixture of hydrocabon gas and air are heated together they will burn if the proportions are right, but if the proportion of hydrocarbon be increased the limits of flammability will at length be passed and the mixture will no longer propagate combustion. However, if heat be applied to this mixture by external means, this noncombustible mixture will react within itself to form a mixture of hydrogen and carbon monoxide that may be made essentially free from carbon dioxide and water vapor. In practice, a noncombustible mixture of hydrocar-



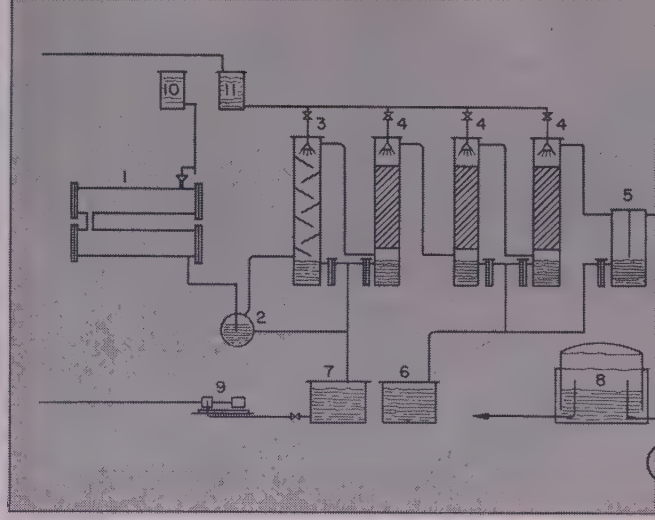


Fig. 4—Recent CG-unit installation

Fig. 5—First Pyrol unit as developed for use in Russia

Fig. 6—Layout of Russian oil-gas plant for converting oil of kerosene grade into a gas to be used for carburizing. (1) Pinch furnace, (2) hydraulic, (3) washing tower, (4) scrubbers, (5) sediment tank, (6) absorbed oil receiver, (7) tar receiver, (8) gas holder, (9) pump, (10) kerosene pressure tank, (11) washing oil pressure tank

bon and air is passed through a tube that is externally heated by being placed in a furnace setting.

In order to hold the operating temperature of the reaction tube within practicable limits, a catalyst was used to speed the reactions. In the early installations this catalyst was simply an iron beam suspended within the reaction tube. The resulting CG-gas contained upwards of 30 per cent hydrogen and some 20 per cent carbon monoxide depending on the primary mixtures used and the temperature of operation. At a time much later than that being described, this CG-gas took on added significance as a carburizing medium—but this will be described in due time in the order of its occurrence. Recent CG-unit installation is shown in Fig. 4.

It is highly significant also, that since the original change which substituted the use of CG-gas for flue gas there has been no further effort made to employ flue-gas, although it holds numerous possibilities. The further development has been along the line of improvements in the use of the diluent—improvements that were perfected at a later date. However, the use of flue gas in connection with the rotary gas carburizing units was found to improve the operation and overcome the objectionable formation of soot which tended to clog these units.

For this purpose and for others that required a special prepared atmosphere, a flue gas unit has developed wherein the gases were dried by refrigeration rather than by circulating calcium chloride as in the early carburizing units. These became known as "DX-units"—which is supposed to be commercial English for de-oxidizing-units.

Tar Reduced—Use of CG-gas as a diluent for the higher hydrocarbons propane and butane tended to reduce the amount of tar formed in the heating zone, and especially since additional gas-inlets were provided along the muffle length which reduced the amount of gas going into the heating zone. As a result of these changes a great many installations have been made which have continued to operate successfully through a number of years.

Another matter in connection with the operation of these furnaces caused considerable annoyance at times. This was the deposition of carbon within the muffle. During continuous operation this carbon accumulated and formed a heavy coke that would build up on the bottom of the alloy muffle. In those cases where the operation was suspended over a weekend, it was customary to burn this out by leaving the ends of the muffle open to the air while maintaining furnace temperature. In this way the accumulated carbon could be burned out. Where this could not be done the accumulation of coke became serious, and at times, would cause the trays to leave the rails within the muffle and make operation difficult. Consequently, it was necessary to provide means to clean the muffle periodically in order to insure smooth mechanical operation.

In the course of continued operation, the alloy muffle itself became highly carburized. In fact, it seemed to act like a permeable membrane. Carbon that entered the alloy on the inside of the muffle would diffuse through and burn on the outside so that there was a continuous gradient of carbon content from the inside outward. Neither this fact nor that of coke deposition on the muffle floor seemed to impair the life of the muffle since it was firmly supported within the furnace structure, and any possible embrittlement of the alloy was accordingly not a factor in reducing the serviceable life of the muffle.

Under Compression—Expansion and contraction of the muffle during heating and cooling was taken care of by keeping the muffle always under compression. This helped to preserve the joints where the muffle sections were in contact and to retain a tight muffle. One point of difficulty arose, however, in the early installations, and this was at the point where the chrome-iron section joined the rest of the "35-15" muffle.

The great difference in the rate of thermal expansion of these two alloys caused them to pull apart

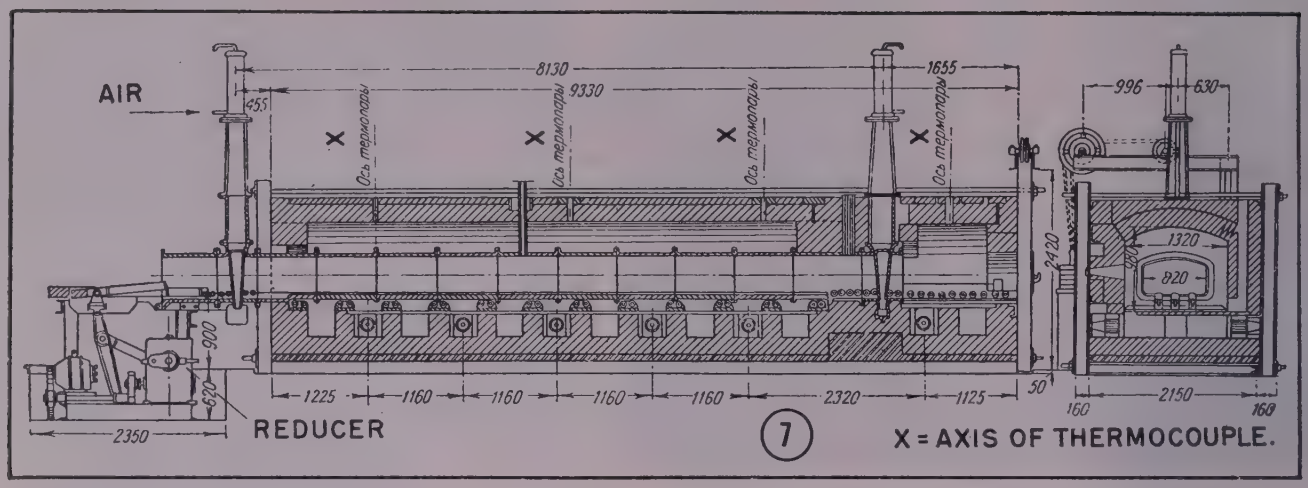


Fig. 7—Furnace for carburization with gases obtained by pyrolysis of petroleum products and constructed at Stalin Automobile Works, Russia. Dimensions in millimeters

whether bolted or welded, and this caused some difficulty in retaining a tight muffle. Furthermore, the chrome-iron sections were hard to make and to machine since it was insisted that they should be practically free from nickel. Such castings are extremely hard and brittle. Many times they would crack at various stages of manufacture, and they were always difficult to handle. However, when once in place within the furnace structure, they were practically permanent since they were used only in the heating zone of the muffle. At a later time their use was discontinued entirely for these reasons, and a single alloy composition used throughout the entire muffle length.

Looking back over these early operations, and in the light of subsequent experience, one can trace the limitations of the original conception and note the reasons—mostly of a practical nature—for the developments that have continued to the present day. Thus, the deposition of carbon on the work in the heating zone became complicated with the formation of tar when using the higher hydrocarbon gases and gave rise to coke formation and spotty carburization.

This complication reduced the importance of the chrome-iron muffle sections in the heating zone, and the removal of these overcame the difficulty in retaining a tight muffle. The large excess of hydrocarbon gas that was employed accumulated as coke within the muffle and caused operating difficulties. The up-to-date plant is free from these handicaps and is subject to a control that has been rendered possible by the hard-earned experience of years.

Dry Cyaniding—As mentioned above, the development of continuous gas carburizing in the laboratories of the Surface Combustion Corp. had been preceded by that of continuous nitriding. This latter process never attained any commercial importance but did provide a lot of valuable experience in the use of ammonia gas when being used continuously in a muffle for the formation of a hard case on steel. As is well known, nitriding works best with steels containing aluminum, but in carbon steels tends to form nitride needles which cause the resulting case to crumble. Since the well-known cyaniding process adds both carbon and nitrogen to the case by immersion in a molten bath of cyanide salts, and since this process found wide acceptance in industry, it was decided to try to combine the two continuous gas processes of carburizing and nitriding into one process and thereby have a "gaseous cyaniding" or "dry cyaniding" as it came to be called.

It is well, in the beginning, to consider the differences that exist between the two processes when carried on separately. Carburizing is carried on at high temperature, ordinarily around 1700° F and forms a case on steel that is rendered hard by a subsequent quenching from high temperature. The degree of hardness attained is determined by the nature of the quench, whether oil or water, and by the temperature from which work is quenched; but in any instance seldom reaches a value as high as 1000 Brinell.

In contrast with this, nitriding is carried on at a low temperature—around 900° F—and requires no quenching to produce a case with a hardness that is seldom less than 1000 Brinell. To obtain these results with nitriding however, a special steel composition must be used, while with carburizing the results are possible with a wide variety of steels. Moreover, carburizing goes on at a rate of about 0.010-inch per hour while nitriding proceeds at a rate of about one-tenth of that.

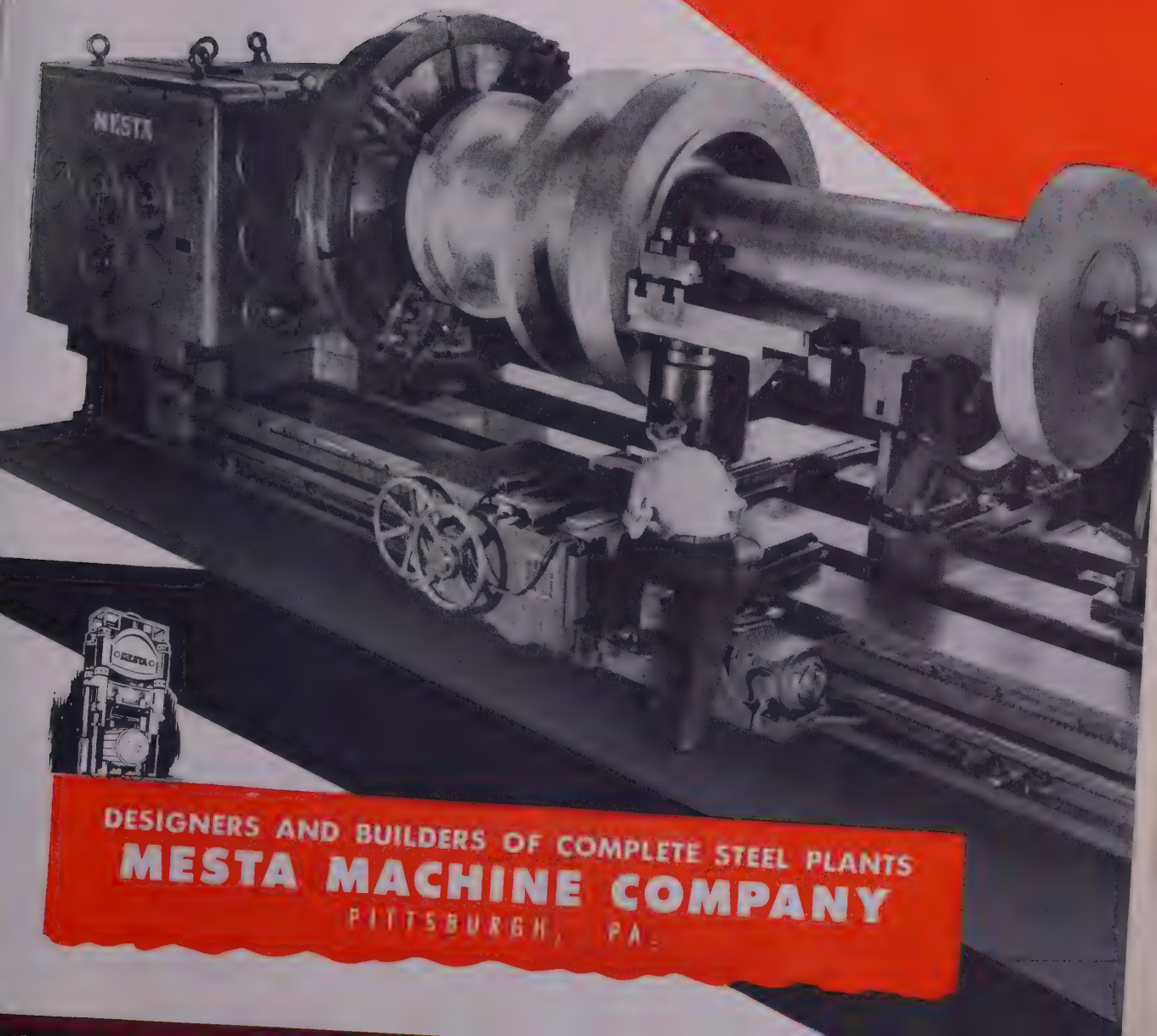
In the "dry cyaniding" process, a mixture of ammonia and hydrocarbon gases is introduced into the muffle near the discharge end just before the work leaves the furnace. In this manner the gas stream is made to flow counter-current to that of the work to be hardened. A temperature gradient is set up within the muffle, so that the usual carburizing temperature is maintained at the work-entering zone and this tapers off to around 1000° F at the discharge end of the muffle. The work is removed from a point of definite temperature into a cooling zone, and is found to be file-hard without quenching. A number of very interesting results have come to light as a result of these operations.

Wide Variety of Cases—An unusually wide variety of cases can be produced by dry cyaniding. If a carbon steel be used it is found that the carburizing which takes place during the high temperature por-

MESTA forgings

Mesta Forgings include massive crank
shafts, marine parts, rotor shafts, roll
and pinions, pressure vessels, pump
blocks, table rollers, and many others.

The massive rotor shaft shown, forged
from ingot poured in the Mesta Open
Hearth Department, is being turned for
a turbine driven generator installation
at one of the world's largest dams.



DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

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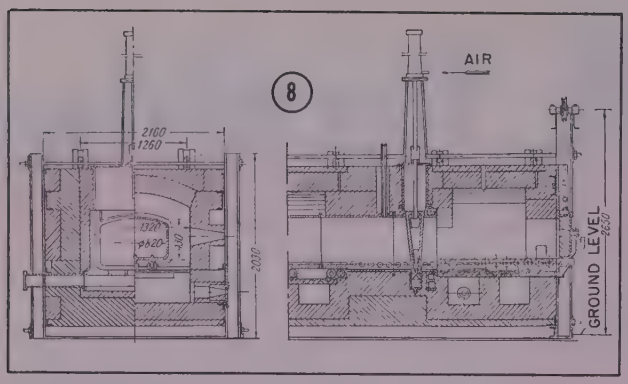
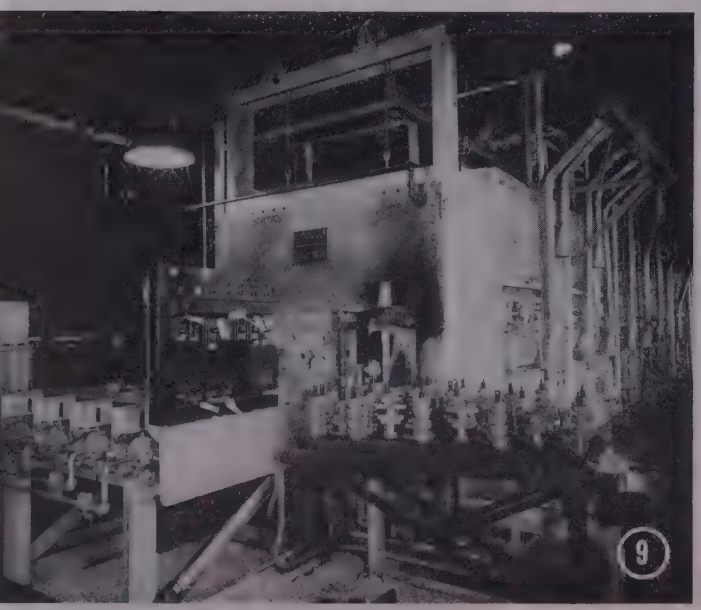


Fig. 8—Discharge end of furnace shown in Fig. 7

tion of the cycle provides a suitable base for the subsequent nitriding that occurs at lower temperatures and adds sufficient strength to support the hard nitride case without quenching. Furthermore, there are no indications of nitride needles even in carbon steel, but the case is hard and strong without being brittle. One other unusual characteristic should be noted: Degree of toughness or brittleness of the case can be controlled by the selection of a temperature from which the work is removed into the cooling zone.

In line with the usual quenching procedure, one would expect that the higher the temperature of removal the harder would be the case, and this would probably be true if the hardness were the result of quenching. Just the reverse of this is true in dry cyaniding. It has been found that removal at a temperature around 1300° F will produce a tough and rather soft case, and that removal from around 900° F will produce a case that is extremely hard, with a tendency towards brittleness. Between these two temperatures a wide variety of case structures can be produced without using a quench that is more drastic than

Fig. 9—Four-row continuous gas carburizer operating without a muffle (alloy), and heated by radiant tube firing



a simple removal into a cooling zone of the muffle. In conjunction with this, the depth of carburizing that is impressed at high temperature can be adjusted as to depth and concentration to provide the type of case that is best adapted to support the nitride structure decired. After these determinations are once made and the gas flows and temperatures controlled, the process is fully automatic. The results are remarkably uniform.

Oil Instead of Gas—One other interesting and important development growing out of this work on carburizing is that of the use of oil instead of gas as the source of hydrocarbon for use in the process. A short time after the presentation of the original paper at the Boston convention in 1931, the writer received a letter from a Russian engineer asking for additional information. There had been frequent references in the technical literature to work being done in Russia in which oil was being used for carburizing. The process seemed to consist of a gasification procedure whereby oil of kerosene grade was converted into a gas that was intended for use in carburizing. Although a lot of work had been done on this subject it seems that it had never attained any industrial importance, only laboratory results so far as could be learned.

They had gone so far as to design a large oil-gas plant for converting oil of kerosene grade into a gas that they hoped could be used for carburizing. Original design is shown in Fig. 6. Surface combustion was approached by the Russians to undertake the development of a process that would depend on kerosene oil for the source of a carburizing gas and utilize this gas in the continuous gas carburizing process.

At first sight the great gas plant of the Russians seemed impractical and it was decided to simplify the operation by cracking kerosene in a heated tube with steam at low temperature. As finally worked out there were two stages in the operation which were both conducted in a single unit under automatic control. In the first stage the oil was cracked in a series of tubes at comparatively low temperature. This resulted in the formation of a very dirty gas loaded with "gunk" and all sorts of ill-smelling compounds (In short the whole organic chemistry textbook came out of the ends of these tubes). After thorough washing with water and oil however a clear gas was produced which was then mixed with steam and reacted in another series of tubes in the same furnace setting but operating at a higher temperature than the first series.

In the first operation a mixture of hydrocarbon gases rich in unsaturates was produced. This was made to serve as the primary carburizing gas, the equivalent of methane, propane or butane in the process already in operation in this country. In the second operation a diluent gas was produced that was high in hydrogen and carbon monoxide, the counterpart of CG-gas in American practice. These operations were carried on in a furnace setting of compact design that was designated a "Pyrol unit". Fig. 5 shows such a unit.

Gratifying Results—Results from the first were extremely gratifying. It was found that the Pyrol unit

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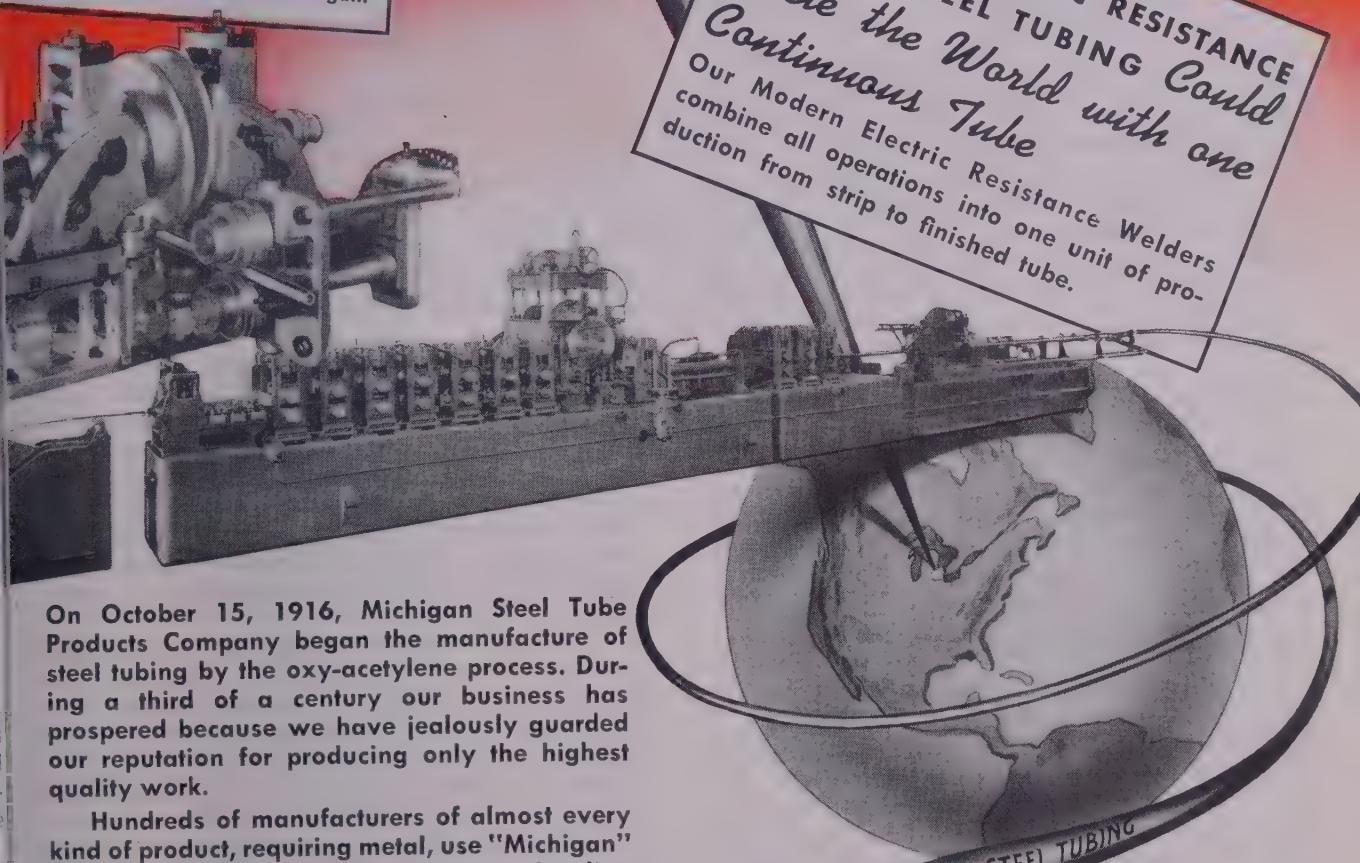

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in operation produced a gas of uniform composition; that the exact composition of this gas was variable at will by changing the rate of oil flow and temperature; and that the presence of unsaturates in the primary carburizing gas gave a very powerful carburizing potential.

The gases were introduced into the furnace muffle at a point near the middle so as to flow both ways, particular care being exercised to prevent their reaching the heating zone for reasons just detailed above.

Some time later, two more furnaces were ordered with the interesting specification that they were to be "exact duplicates" of the original. The engineers who inspected this work were not concerned at all about the process, or method of operating; their only concern was to see that every detail of construction was identical with the original. At a later date, four more furnaces were ordered, and before the U. S. had entered World War II, they came through with a priority rating that increased the number to 40 furnaces with an equivalent number of Pyrol units.

This was an interesting development—one that has never been exploited in this country. The work in this country moved away from the use of highly concentrated hydrocarbons in the direction of carbon control of the case, and the use of better mechanical equipment.

Mechanical Improvements—A mechanical development in other fields had reached considerable proportions, and this was now employed to overcome some of the limitations of the original apparatus, and to extend the usefulness of the process. This development was first employed in the annealing of steel sheets in stacks. A new method of heating was used which became known as radiant tube heating. By this means the products of combustion from the fuel gas were kept from entering the work-chamber by being confined within an alloy tube which was heated to radiant temperature by gas burners firing into the tube. These tubes were suspended along the furnace length and provided means for heating the work without contamination as result of combustion gases.

In this case the walls of the furnace became the muffle to contain the carburizing gases thereby eliminating the long and cumbersome alloy muffle that had been previously used. The method of radiant tube operation that was used caused these tubes to operate under suction so that any leakage in the tube would draw gas from the muffle rather than cause contamination by forcing the combustion gases into the muffle.

There was the further advantage that the individual tubes could be replaced during operation rather than a prolonged shutdown to replace a burned-out alloy muffle section.

At once a number of advantages became evident. For instance, several lines of work could be operated at the same time. It was possible to produce work having different case depths, by simply varying the time-of-push of the different lines; in other words, each line could be operated as a separate unit. Of course, there were important considerations as to uniformity of loading, etc., but these are factors also in the operation of any continuous unit to insure uniform results. As many as four separate lines have been operated in one furnace setting. Such a furnace is shown in Fig. 9.

Control of Carburizing Atmosphere—A more recent advance is concerned with the control of the carburizing atmosphere. In the early installations it was found necessary to provide much larger quantities of hydrocarbon gas than were required for carburizing alone.

This, naturally, caused deposition of free carbon or soot on the walls and floor of the muffle which had to be removed from time to time with much trouble and expense. It had been known that the presence of moisture in the atmosphere gases had a strong retarding effect upon carburization.

To overcome this an attempt was made, in the early installations to dry the gases by means of calcium chloride towers, using both liquid and dry salts to make these gases as dry as possible. The methods of mechanical refrigeration had not been developed at that time as they were at a later date, so that the method used was thought to be the cheapest and most practical. Even so, the amount of hydrocarbon entering the muffle was far in excess of the requirements for carburizing the steel.

A further study of the method employed for producing CG-gas showed that it was possible to conduct the operation so that the moisture content of the resulting gases could be maintained at a very low value.

In fact, the presence of moisture, as of carbon dioxide in these gases was a sign of incomplete reaction within the reaction tube. In order to form a gas that was sufficiently dry for the purpose there were three things which had to be stabilized in the operation of the CG-unit: First, operating temperature; second, rate of gas flow through the unit; and third, type of catalyst used. One other very important item, of course, was the proportion of gas and air used.

In the operation of the CG-unit it was discovered possible to balance these necessary elements so as to provide a wide variety of carburizing gases, any one of which could be maintained at uniform composition by harnessing these variables of operation.

This work pointed the way to the reduction of the amount of hydrocarbon gas to be introduced into the carburizing chamber. It was thus possible to compound a gas mixture that would be in chemical equilibrium with a particular carbon content of case to be formed on the steel.

This particular development has been extended to a different field and used for the reclaiming of parts that have had a flash decarburization during the process of fabricating. Such parts have been found to fail in physical tests, and until the present time there has been no satisfactory way of reclaiming them. By means of the method described above, the original carbon content of the case can be restored and the part placed in service with satisfactory results.

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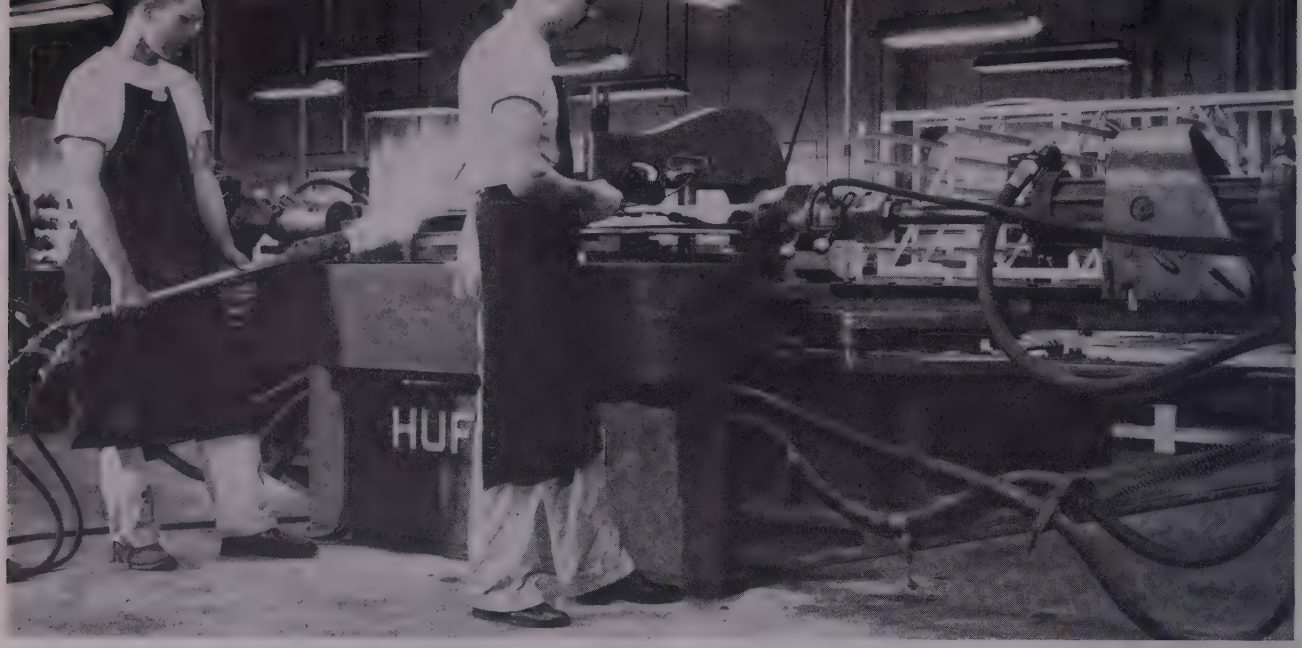


Stretch-forming magnesium canopy bows for training plane. Man at left is heating part with gas torch while the other is checking temperatures with a potentiometer. Production-run heating will be in an oven

STRETCH-FORMS MAGNESIUM

In Experimental Aircraft Manufacture

STRETCH-FORMING is being utilized in the manufacture of magnesium alloy canopy frames for prototype models of the TE-1A military type trainer at Texas Engineering & Mfg. Co. Inc., Dallas. Although the operation is still in an experimental stage, it is thought that it will effect a pronounced reduction in fabrication cost when the new trainer goes into quantity production.

Canopy frames are fabricated from Dow FS-1 alloy Y-channel sections. While extrusions will be used for the production version, the initial channels have been cut from ½-inch sheet stock and milled on a Cincinnati milling machine to provide the proper section. A single contour bow frame for the front and center sections of the canopy and a double contour bow for the rear section are required.

Bows Stretched—In the experimental operation only the single contour bows and the main contour of the rear bow are stretch formed, the operations being performed on a Hufford stretch press. Second contour of the rear bow is formed on an hydraulic arbor press. Plans are being made, the company states, to mount the stretch die on a cam and tilt the front so that both contours of the rear bow can be formed with a single stretching operation during the production run.

Principal difference in stretch forming the magnesium channel over stretching a comparable aluminum section is that both the part and the die must be preheated. In the experimental operation, the Kirksite stretch die is preheated to 450° F and the magnesium channel is then loaded into the press and heated with a gas torch to 450 to 500° F prior to the forming operation. Temperatures are constantly checked with potentiometers during the heating period to insure even temperature throughout the length of the part, since this is essential to proper stretch forming. In the production run an oven will be set up next to the press and used to preheat the extrusion.

Annealing of Springs Controlled

ELECTRONICALLY-OPERATED equipment for the close control annealing of flat and clock-type springs is in operation in the plant of Wilson's of Cleveland, Cleveland. According to the company, this method has proved satisfactory in improving the quality of springs used in their own product; it is now being made available to other manufacturers using flat or clock-type springs.

Through this new annealing practice, breakage of springs at points of attachment is minimized, production is speeded up and spring quality is kept uniform. The company can supply springs ⅛ to 1 inch wide, in any length or temper. They may be of the flat or clock-type and with plain or shaped ends.

Wire Rope Recommendation

REVISION of simplified practice recommendation R198-43, wire rope is being offered by National Bureau of Standards, Washington, for comment, acceptance, or both. Adding a new table is effecting a reduction in variety of stock items, the proposed revision includes sizes, construction, grades and breaking strengths of the majority of tonnage of wire rope.

According to the bureau, general adherence to the 21 tables included will result in a net reduction of 33 per cent in stock items. Major production and use of wire rope and the predominant tonnage is covered by four different rope constructions, with a reduction in variety of 48 per cent.

Giant Machine Functions as

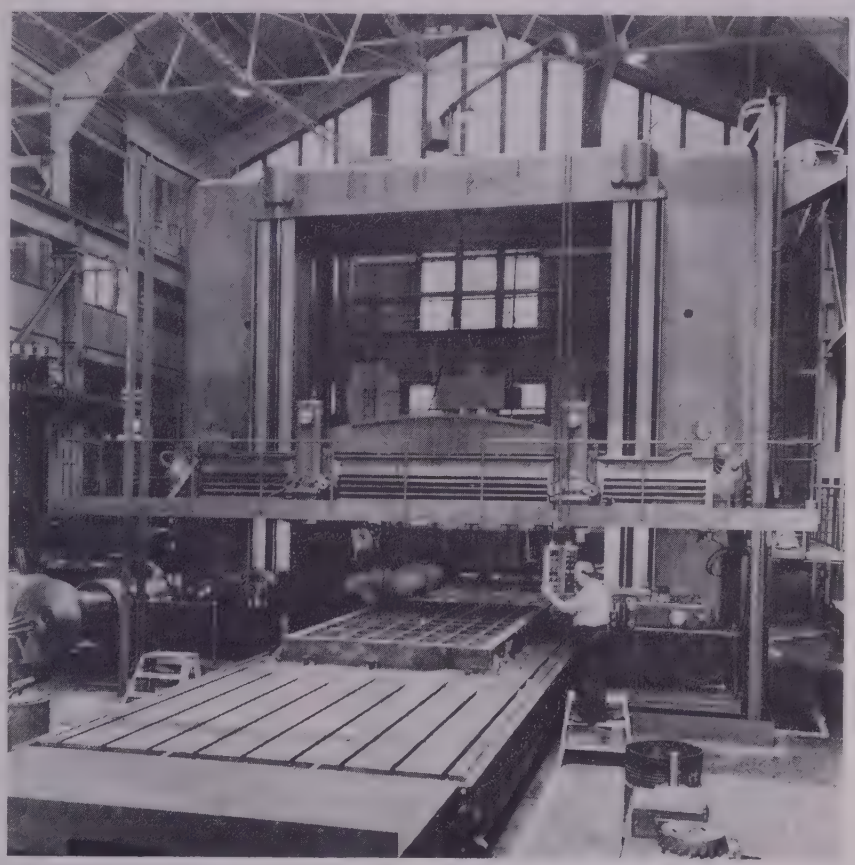
Miller and Planer

GIGANTIC planer and milling machine which is capable of shaving a sliver 0.0001-inch thick from a steel block the size of a railroad box car is now in operation in General Electric Co.'s Schenectady Works. Built by Consolidated Machine Tool Corp., Rochester, N. Y., and powered with GE motors, the machine will be used in the manufacture of equipment for industrial and power generating applications, such as synchronous condensers, hydraulic turbine-driven generators and large steel mill motors and generators.

Machine has a 27-foot high arch with a 40-foot long table which slides through the archway. Capable of functioning as either a planer or milling machine, it eliminates the task of transferring materials to another machine when both operations are required. The table will carry loads up to 200 tons and, because of its size, will permit several parts to be bolted together and handled as a single unit.

The foundation for the machine required 30,000 pounds of steel and enough concrete to lay a sidewalk more than 2½ miles long, GE engineers said. Regulated from two pendent pushbutton stations, the machine is completely controlled by electronic equipment. The stations, one for each operation, hang from the top of the arch. They can be carried to different locations, enabling the operator to control the machine with a minimum of difficulty.

An emergency lever, which responds to a slight touch of a finger, protrudes from the bottom of the pendent station and will stop the machine instantly when touched, according to engineers. A single switch converts the machine to either the planing or milling operation. When performing as a planer, 100 hp motor moves the table at speeds ranging from 10 to 150 fpm. During milling, the table travels from 3 to 45 inches per minute; two 50 hp motors operate cutters. Maximum length of material which can be milled is 30 feet.



High Hardness in New Stainless

REQUIRING only a 850 to 1000° F temperature for hardening treatment, a new grade of stainless steel developed by Armco Steel Corp., Middletown, O., has high hardness and strength, good corrosion resistance and good fabrication characteristics. According to the company, the 17-4 PH steel may be used for gears, cams, shafting, chains, valves and pump parts in equipment where high mechanical properties and corrosion resistance better than can be obtained with present hardenable grades are necessary.

Containing 17 per cent chromium, 4 per cent nickel and 4 per cent copper, the stainless steel is said to have a corrosion resistance better than that of standard hardenable alloys and approaching that of 18-8 stainless. Hardness values of Rockwell C40 to 45 high tensile and yield strength, reportedly are obtained by precipitation hardening.

Heat treatment at 850 to 1000° F eliminates such problems as quenching cracks, distortion, internal stresses and scaling, the company states. Since only an easily removed surface discoloration is produced in the precipitation hardening, parts can be finished machined before hardening. The new steel can be hot-forged and has good machining and welding properties. It is available as bar and wire.

—o—

GRAVITY feed, wick feed, constant level, vibrating rod and multiple oilers are featured in an 8-page booklet offered by Gits Bros. Mfg. Co., Chicago 23, Ill. Included is detailed information on each type, pictures, stock numbers, capacity, thread, dimensions and prices.

Tank Calculator Offered

ACCURATE determination of the most satisfactory high water level in pressure tanks under all operating conditions is possible with the Autocon hydro-pneumatic tank calculator, devised by Automatic Control Co., St. Paul, Minn. Based on the Boyles law, it instantly tells the best air-water ratio, the most efficient pressure differential, the exact amount withdrawn on any pressure drop and the resultant reserve or residual.

Left—General view of air compressor room

COMPRESSED AIR POWER

Facilitates Manufacture of Aircraft Engines

IN THE huge Wood Ridge, N. J., plant of Wright Aeronautical Corp., containing 52½ acres of floor space devoted exclusively to the manufacture of aircraft engines, compressed air is a major factor in maintaining efficient manufacturing schedules. To supply air to the thousands of locations throughout the plant where it is employed, a battery of five compound, motor-driven compressors is used.

No. 1 compressor is a 1500 cubic feet per minute, 600 rpm, powered by a 300 hp motor; No. 2 is 2300 cfm, 180 rpm, powered by a 438 hp motor; No. 3 is 2700 cfm, 180 rpm, powered by a 500 hp motor; No. 4 is 3400 cfm, 164 rpm with a 700 hp motor; and No. 5 is 3400 cfm, 164 rpm, powered by a 700 hp motor.

Each compressor is equipped with an intercooler and aftercooler, and a surge tank and filter on the air intake, and discharges into its own receiver. All receivers are connected through valved lines to a 10-inch common header that extends the full length of the plant, inside an underground pipe tunnel. At three intervals in its length, 10-inch lines branch from the header and come up inside the building. Each branch line is equipped with an air separator.

Operating Pressures—Air operating pressure at the compressors is 100 psi gage. An alarm bell provides a signal if the pressure drops to 90 pounds at which time one or more additional compressors can be started merely by pressing a starting button. Under normal conditions, three compressors carry the load during the winter months, while four compressors are required for summer operation. However, when the experimental cells in which aircraft engines and turbines are tested are in operation, the full battery of compressors is needed during the 2 or 3 hours of the tests.

Peak output of the plant on an average winter weekday is 6100 cfm while the total output for 24 hours exceeds 5 million cu ft.

Of the three 10-inch air lines branching from the tunnel header, as mentioned, one serves the turbo test department, providing air for testing turbines, carburetor air for testing single cylinders of aircraft engines, air for the operation of pneumatic hoists, and low pressure air for instrument controls. The air is here reduced in pressure through a 6-inch line and reducing valve to 40 pounds, and through a reducing valve to 20 pounds to supply control equipment used in regulating flow of air, fuel, oil, etc., to aircraft engines on test. A 4-inch branch line feeds the service building, experimental test, unit laboratory turbo building and the turbo laboratory.

The other two 10-inch lines connect with the air piping in a specially arranged grid type distribution piping system that feeds all parts of the building with air, water, steam, etc. At short intervals, each final distribution 1-inch bay line of the grid air piping is provided with a ¾-inch valved takeoff connection. This permits great convenience and flexibility in the use of air throughout the plant since no location is more than 20 feet from a connection.

Foundry Operations—Beginning in the foundry, where aluminum and magnesium castings are poured, air is employed to operate hoists, vibrators on molding machines, as well as portable hose lines used for blowing dust and grit from molds, etc. In the plating department, where engine parts are given corrosion and wear-resisting coatings on certain surfaces, air operates the instrument controls.

The heat treating department also utilizes compressed air for operating instrument controls and furnace mechanisms. In addition, grit blasting of parts is carried on by means of air pressure.

Machine tool pneumatic chucks, hand grinders used for removing burrs from engine parts, and for blowing metal chips from the machines, are all air-operated.

Baffle Shop—The baffle shop produces sheet metal baffle parts mounted on aircraft engines to direct cooling air. Here compressed air powers a number of metal stamping presses and riveting machines. Combined with gas, it also operates torches employed in heating metal parts prior to bending to shape.

In the inspection department air powers a testing apparatus capable of exerting a pressure of 8000 psi.

Hundreds of air-operated tools are employed in assembling engines in the assembly department. Air is also used for the same purpose in the service division.

Left—Using air-powered wrench to rotate engine assembly stand

Data and illustrations were obtained by the Compressed Air & Gas Institute.

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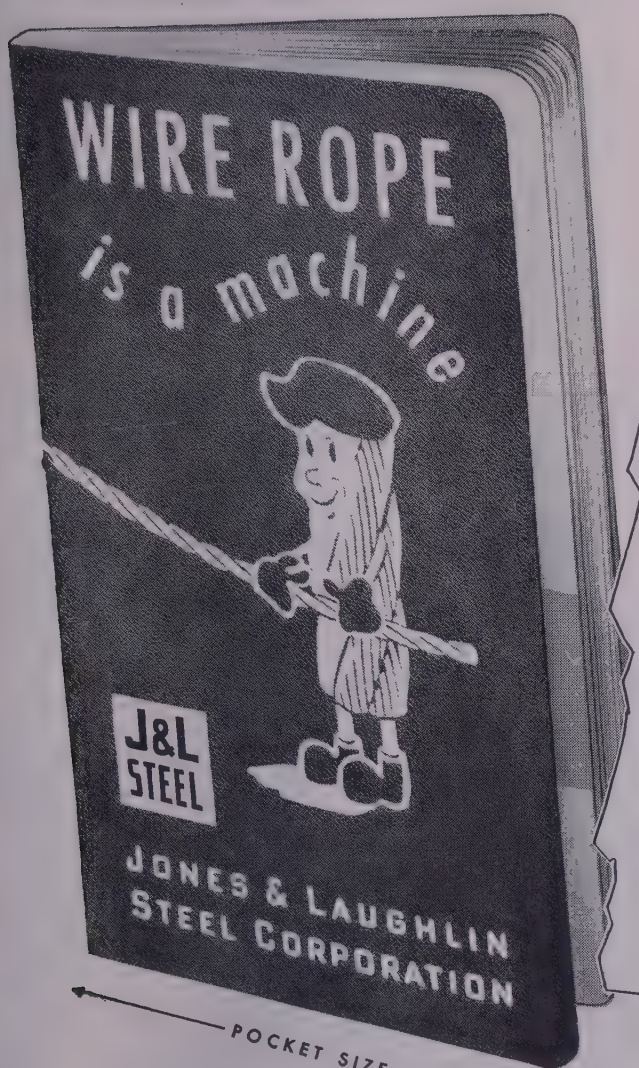

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NUMBER **13** OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

Production of PIG IRON

Increase in pig iron production during the last half-century was effected not by any fundamental change in ore reduction methods but by improvements and refinements in auxiliary equipment, improved raw material preparation and selection and the more intelligent handling of furnace operations

By B. M. STUBBLEFIELD
Manager Chicago District
Youngstown Sheet and Tube Co.
East Chicago, Ind.

PART I

AN iron blast furnace is more than just a unit designed for the reduction of iron from its ores. It is truly a working monument to our present advanced state of metalworking, referred to as the age of iron, and the importance of its product, pig iron, in our economy and mechanized civilization cannot be over emphasized. Pig iron is not only used as a finished product in a large casting industry, but it also provides raw material for the entire steel industry. Size and growth of pig iron production over the past 75 years are shown in Table I.

As of January 1, 1948, annual capacity of United States blast furnaces stood at an all time peak of 66,341,930 tons. Individual furnaces have produced as high as 1700 tons of iron per day. When it is considered that approximately 7 tons of raw materials, including both solid materials and air, are required to manufacture a ton of pig iron, one can appreciate the enormous amounts of material which

Fig. 1—View of a typical blast furnace plant

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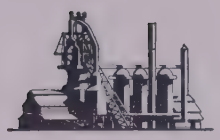

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30 Rockefeller Plaza, New York, N. Y.

The author Buford M. Stubblefield is a native of McLean, Ill. and was graduated in 1915 from the University of Illinois. A few months later he was employed as a chemist by the American Tar Co., Youngstown.

In 1916 he joined Youngstown Sheet and Tube Co. as foreman of the benzol plant. He advanced to general foreman and in 1920 became assistant superintendent of the Campbell Works coke plant. Three years later he was named superintendent, and in 1929 became superintendent of both coke plant and blast furnaces.

Five years ago he was appointed superintendent of the company's Brier Hill Works, and a few months later was advanced to assistant general superintendent of the Youngstown district.

On Jan. 1, 1947, he was advanced to general superintendent of the Campbell Works steel plant, blast furnaces and the Struthers works, and 15 days later was named manager of Youngstown's Chicago district properties.

must be handled at the furnace. Table II illustrates the approximate requirements for a furnace producing 1440 tons of iron per day, which is equivalent to a ton each minute. To furnish the amount of solid raw materials required daily would require a train of over 100 cars in length.

It can also be readily seen in the table that weight of the air, or blast, is more than the combined weight of all solid materials in the burden. It will also be noted that the mass of gas produced exceeds by far the total amount of both slag and iron, and, on occasion, the iron blast furnace has been referred to as a large gas producer rather than a smelting operation.

Man's earliest efforts in the production of iron are hidden in the pages of antiquity. However, some evidence exists that, as far back as 4000 years ago in the Biblical areas surrounding the Red Sea, wrought iron was produced by heating a mixture of charcoal and iron ore on an open hearth to a pasty mass. This intimate mixture of iron and slag was worked by hammering to produce the desired shape which, incidentally, squeezed out some slag. Although the Greeks and the Romans introduced this process throughout Europe, they made practically no improvements in this method of reducing iron ore. Sometime in the 14th century, in the Rhine area of Central Europe, addition of the furnace stack was made. Because of additional reduction from the action of the stack's reducing gases and because of the increased hearth temperature from the saving in heat, which made possible a fluid separation of molten slag and iron, the art of iron casting was introduced.

Little further progress, except for the gradual evolution from a natural draft to low pressure draft, operated manually or by water power, was made until the turn of the nineteenth century. At this time, in England, the steam engine was invented and applied to the pumping of the blast. Some twenty years later, use of the hot blast was introduced in Scotland. This gradual development of the application of a hot blast has been the most important

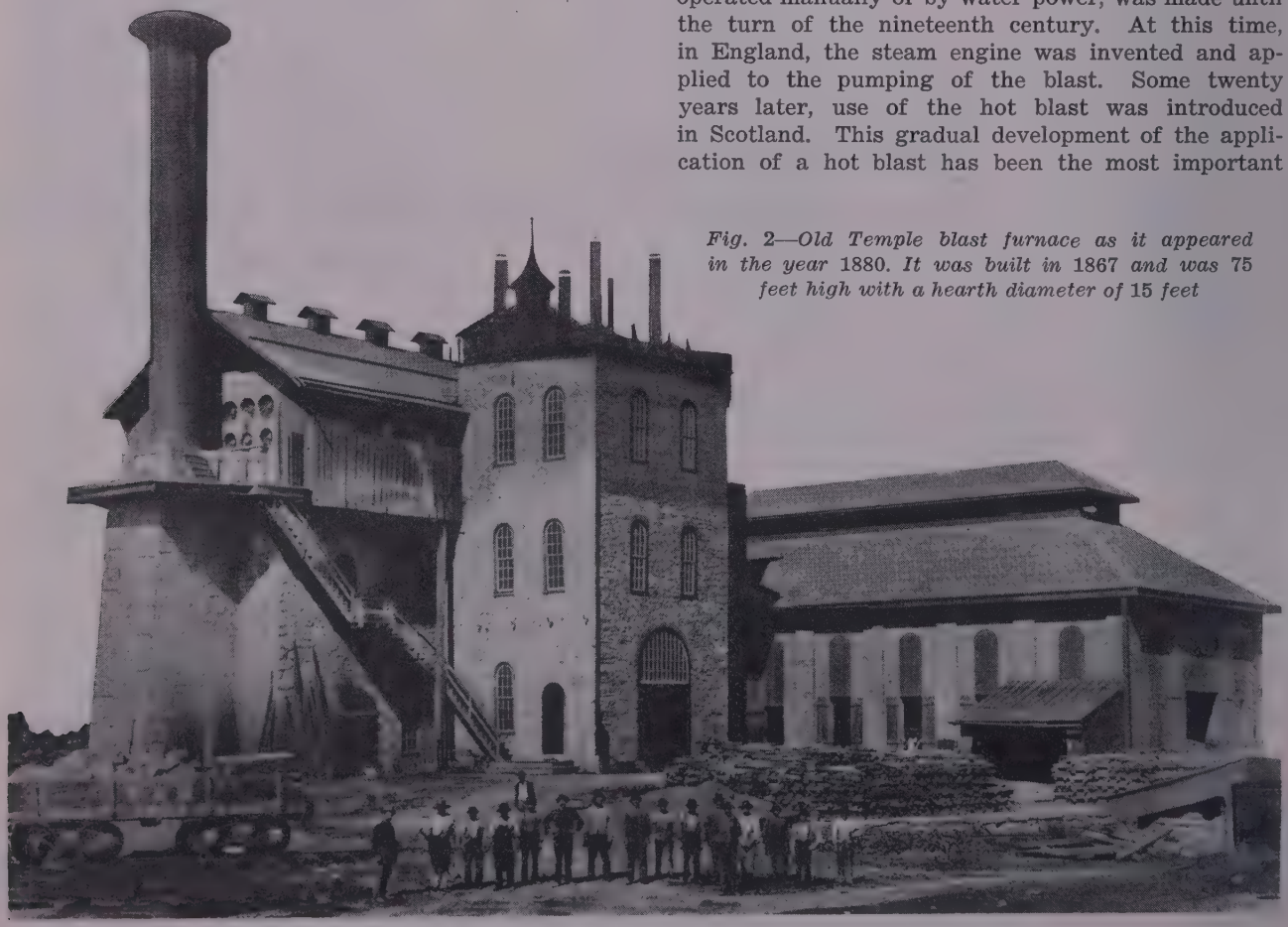


Fig. 2—Old Temple blast furnace as it appeared in the year 1880. It was built in 1867 and was 75 feet high with a hearth diameter of 15 feet

Fig. 3—Bulldozer is seen moving iron ore from stock pile to loading hopper at a Minnesota mine

PIG IRON

advance in the evolution of the blast furnace, since the rate of furnace production depends upon the rate of fuel consumption, which in turn depends upon the rate and amount of air in the blast.

First United States furnaces were built in 1620 in New England. During the next 200 years the industry grew, expanding westward into Pennsylvania and Ohio, but technical progress was very slow. After the civil war, around 1880, the real evolution of the modern blast furnace began in this country. Many reasons, including the development of Lake Superior ores, the Connellsville coking coal, and the expanding economy of the country, were responsible for a very rapid growth, and more furnaces were constructed during the 10 years following 1870 than at any other time in our history. Within the short period of a decade, the United States became the world leader in the production of pig iron, a position which has been maintained without question to date.

Until about 100 years ago blast furnaces were small affairs, constructed of masonry about 25 feet in height with a maximum daily capacity of about 5 tons. By 1880, these furnaces were constructed of refractory lined steel or wrought iron plates with similar lines to our modern furnaces of 1500 tons, and capacity had been increased to 100 tons per day. The actual refining process of 100 years ago and today are identical. Solid materials, ore, fuel and flux, are charged at the top and descend through the vertical shaft of the furnace, meeting an upward flow of hot gases containing excess carbon monoxide. The iron oxides are reduced to metallic iron which melts and is tapped from the furnace bottom periodically. The nonreducible impurities in the ore and in the fuel combine with the lime in the flux to form a fluid slag which is also tapped periodically.

Consequently, growth in pig iron production in the past 50 years has been accomplished not by any fundamental change in the method of ore reduction, but rather by improvements and refinements in auxiliary equipment such as blowers, stoves, charging apparatus and top mechanism, by improved preparation and selection of raw materials, and by improved understanding and handling of furnace operations. These factors have made possible increased furnace size and capacity with the result that, although the number of furnaces in operation has been constantly declining, annual capacity has steadily increased. Present limitations to increased furnace capacity are physical size of the furnace and necessary auxiliary equipment to handle the vast amounts of raw material and slag disposal.

Iron ore is the original source of all iron and is the one essential raw material for iron blast furnace production. Iron bearing minerals, although rarely as a pure iron mineral, are widely distributed throughout the earth's surface. In practically all deposits, iron minerals occur in either chemical or physical combination with various other elements. Since an ore is defined as a mineral from which one or more elements can be profitably extracted, many iron mineral deposits fail to classify as an ore, generally because of a low iron content, presence of undesirable elements, size of deposit, or uneconomical mining or transportation problems. With gradual depletion of the high iron content ores in the Lake Superior region, the low iron content taconites in this region, which a few years ago, were regarded as of no value, are now being reconsidered as commercially important deposits.

On a chemical basis, the most predominant iron bearing minerals are the oxides, carbonates, silicates and sulphides. Neither the silicates, which are generally combined and not pure iron silicates, nor the

TABLE I
PIG IRON PRODUCTION
(Including Ferro-Alloys) in Tons.

Period	Production	Period	Production
1871–1875	2,518,000	1906–1910	26,908,000
1876–1880	2,870,000	1911–1915	30,820,000
1881–1885	4,817,000	1916–1920	41,452,000
1886–1890	7,929,000	1921–1925	34,132,000
1891–1895	9,109,000	1926–1930	42,215,000
1896–1900	12,871,000	1931–1935	17,486,000
1901–1905	20,428,000	1936–1940	36,174,000
		1941–1945	59,649,000

Production figures given in this table are taken from the "Statistical Abstract of the United States" and represent the average yearly production over the given period.

DANLY PRESSES

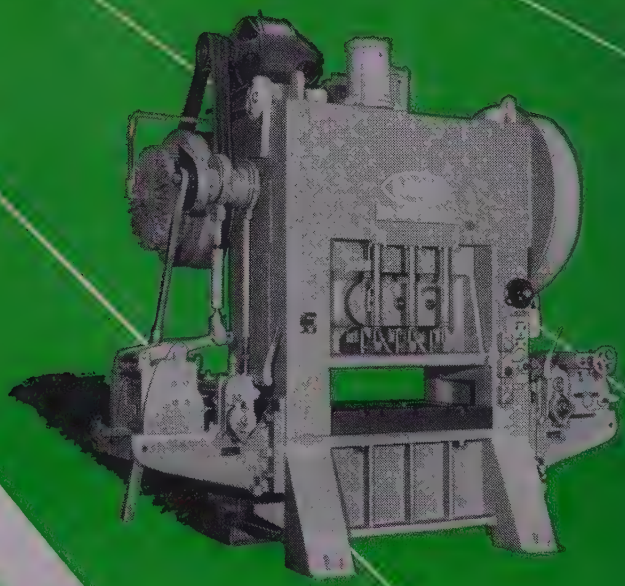
1. new design features
2. extra rugged construction
3. record-breaking performance

LEFT—Cut-away view of special Danly pitman wrist pin design showing guide construction. RIGHT—Cut-away view of Danly Clutch showing long wearing, easily replaced friction discs.

1. New Design Features . . . Press engineering achievements like the Danly "low inertia" clutch, positive automatic lubrication, special pitman wrist pin design and sensitive electrical controls assure ease, economy and continuity of operation.

2. Extra Rugged Construction . . . Special structural features like the extra heavy stress relieved frame weldments, oversized tie-rods and bronze lined, fully adjustable gibs make every Danly Press more rugged . . . to withstand the continual abuse of 24 hour, 7 day week operation.

3. Record-breaking Performance . . . The exclusive Danly "low inertia" clutch alone minimizes the most troublesome source of press maintenance cost and work stoppage because it out-wears conventional type press clutches 10 to 1! A greater proportion of the clutch assembly mass revolves continuously with the flywheel to reduce the clutch "pick-up" load. Thus, less heat is generated. Forced air circulation contributes further to cool operation.



THE NEW AUTOFEED . . . Uninterrupted high volun production is a must in the large electrical manufactu ing plant where this newly designed press is operation. Higher capacity in both tonnage a speed, with fully automatic stock feeding, mak this the truly modern press for high spe production stamping. Costly press downtin is greatly reduced because of substantia greater frame rigidity which reduces vibr tion at higher operating speeds. For th reason your dies last longer betwe grinds. Available from 50 to 8 tons in extra heavy constructio

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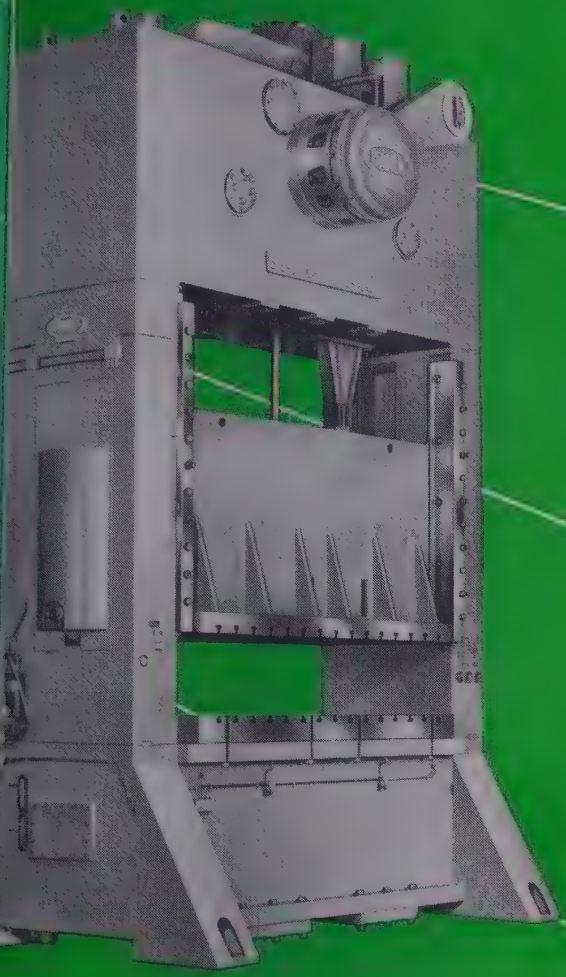

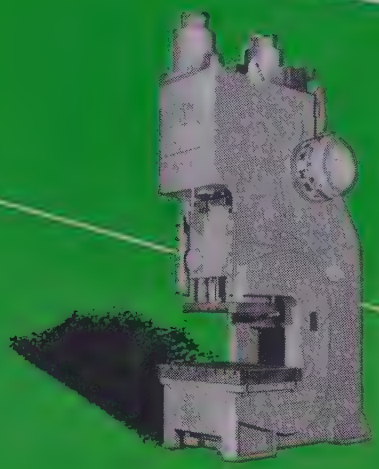

GAP FRAME . . . This 200 ton Danly Gap Frame press shows how modern eccentric gear construction permits a compact closely coupled drive. As a result, drive members are more rigid and wear longer. Other types include inclinable presses, underdrive presses, and special welding presses Whatever your mechanical press requirements, you can have the advantages of the exclusive Danly construction and engineering features.

STRAIGHT SIDE . . . This new single action press was recently installed in a leading automotive manufacturing plant to help reduce stamping costs. Presses are available from 50 to 3000 tons with one, two or four point suspension and single, double or triple action. All of the special Danly features . . . plus engineering to meet your press requirements . . . assure you that a Danly Press will do your job faster and more efficiently.

Check these advantages and see how DANLY PRESSES can cut your production costs.

- ✓ greater rigidity . . . the entire frame is constructed to minimize deflection and vibration at rated capacity.
- ✓ less downtime . . . positive lubrication, longer clutch life and increased accessibility of brake and clutch components subject to wear are only a few of the features that make Danly Press maintenance less frequent and less costly!
- ✓ precision construction . . . balanced rotating parts and precision machined guides reduce wear and assure accurate die closure.
- ✓ extra sensitive controls . . . special five position clutch controls with built-in safety features facilitate die tryouts and protect the press mechanism.

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MECHANICAL PRESSES...50 TO 3000 TONS

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Fig. 4—From atop a string of loaded ore cars, one gets an idea of the immensity of the 80-foot boom which handles a bucket capable of filling a 50-ton ore car in less than four bites

sulphides are classified as iron ores. Less than 1 per cent of the iron ore used in the blast furnace is derived from a sulphide mineral, and then it is the by-product of another refining process after roasting the ore to remove the sulphur. The silicate deposits are only important as a source of future iron ores, as the silicate is converted to an iron oxide by the weathering action of water, carbon dioxide and air. Table III illustrates some of the properties of the main iron ores.

The most widely distributed and commercially important of these ores is hematite, which accounts for 70 per cent of the world's and 85 per cent of the United States' production. Next in importance is magnetite, which, because of its magnetic properties, provides for easy magnetic separation from the nonmagnetic impurities after suitable grinding. Limonite is the only other ore used in this country. Siderite, which is generally prepared for the blast furnace by calcining, is the principal ore used in England.

Most important ore producing district in the United States is the Lake Suprior region of Minnesota, Wisconsin, and upper Michigan. This region has supplied about 85 per cent of the ore used in the United States over the past 50 years and has been partially responsible for the growth and concentration of our iron producing center in the Great Lakes region. Most Lake Superior ore is hematite, although large quantities of both magnetite and limonite are found. The Mesabi range has been the most productive, accounting for about 75 per cent of all ore mined in this region. Majority of the Mesabi deposit is a soft red hematite, which can readily be removed by open pit mining methods. In the old ranges, Marquette, Menominee, Gogebic and Vermillion, underground mining is employed. Originally, these Lake Superior ores ran around 65 per cent Fe, 3 per cent Si and 8 per cent moisture. As the tonnage of ore mined yearly increased and as high grade ore was gradually depleted (Table IV), iron content has decreased and silicon and moisture contents have increased. At present, the iron content runs arount 51 per cent with 9 per cent silica and 11 per cent moisture. This change in ore composition has had a great effect upon furnace operations, and much effort and money is now being expended to utilize by beneficiation the vast reserves of low grade taconite ore. In addition to classifying Lake Superior ores by range they are also classified commercially by chemical content as shown in Table V.

Ore samples are checked for chemical analysis at the mine as the material is loaded into cars for transportation to upper lake ports. At the ports, depending upon car analysis and weight, it is stock piled in various bins. Each bin holds a tonnage equivalent to one ore boat load and contains an average analysis of one of the specified grades. In this fashion, by mixing various shipments of ore from different mines at the docks, the material supplied to the furnace is much more uniform in both physical structure and chemical composition than could be obtained from the product of any one mine.

The second largest iron ore producing district in this country is the Red Mountain district in Alabama. This Clinton deposit, which supplies about 9 per cent of this country's production consists mainly of red and brown hematite of fairly low iron content, about 43 per cent. A high lime content which tends to make these ores self-fluxing compensates for this rather low iron content. In addition, coking coal deposits are in very close proximity to ore deposits, so that transportation costs are at a minimum. All of the high grade ore which could be mined by the open pit method has been exhausted and now underground mining is used exclusively. This ore is generally crushed and sized before shipment to the blast furnace.

Magnetite ores of Pennsylvania and New York,

TABLE II

AMOUNT OF RAW MATERIALS USED AND PRODUCT PRODUCED IN A 1440 TON DAILY CAPACITY BLAST FURNACE

Raw Materials	Tons per Day	Tons per Minute
Solid materials charged at top		
Iron Ore and Iron Bearing Materials such as Sinter, Scrap and Mill Scale	2880	
Fuel—Coke	1370	
Flux—Limestone & Dolomite	610	
Total	4860	3½
Air at the Bottom	5050	3½
Product		
Tapped at the Bottom		
Iron	1440	1
Slag	860	3/5
Gas Produced at Top	7500	5½

These figures are only approximations, and consequently, total raw materials and total products will not balance exactly.

TABLE III

PROPERTIES OF TYPICAL IRON ORES

Mineral	Chemical Name	Formula	% Iron Theoretical	Density	Color
Magnetite	Ferroso-ferric oxide	Fe_3O_4	72.4	5.0–5.2	gray to black
Hematite	Ferric oxide	Fe_2O_3	70.0	4.9–5.3	red to purple
Limonite	Hydrous ferric oxide	$xFe_2O_3.yH_2O$	52.3–66.3	3.6–4.0	brown
Siderite	Ferrous carbonate	$FeCo_3$	43.8	3.0–3.9	brown to black

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The switching element, embodying the famous MICRO SWITCH snap-action principle, is sealed within a sturdy die cast housing. The actuating mechanism operates through a seal which protects the switch against dirt, dust and splash of oil or water. The switching element is easily replaceable. Large, heavy duty terminal screws and ample wiring space simplify installation.

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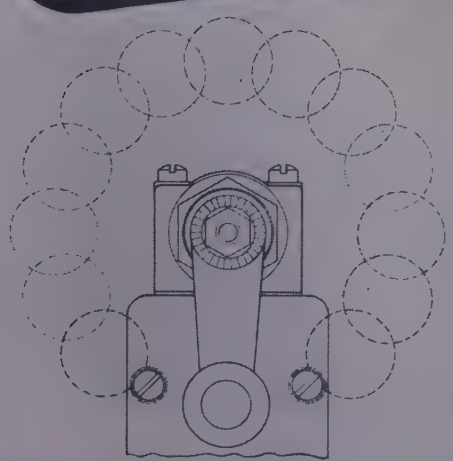
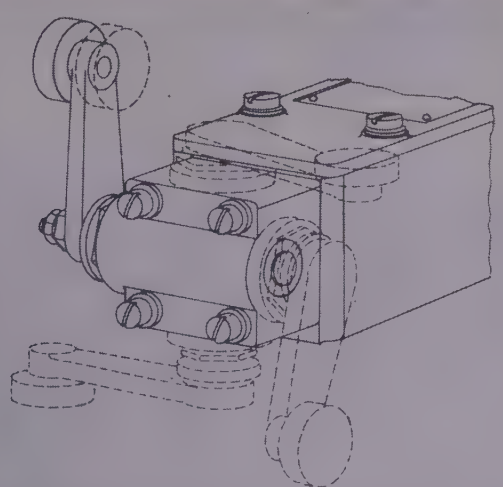


Roller arm may be positively locked in any of 870 different operating positions at intervals of approximately 0.4°.



Operating head can be mounted in any of the four positions shown. In addition, roller arm may be reversed as indicated.

which were the foundation of our early iron industry, still furnish approximately 3 per cent of our requirements. Most of this material is a hard lumpy ore which must be crushed, concentrated magnetically and sintered.

An additional 3 per cent of our ore comes from scattered deposits of hematite and magnetite in Utah and Colorado. The balance used in this country is imported by plants along the Atlantic coast. This ore comes principally from Chile, Cuba and Sweden and is generally not as well prepared as domestic ores and quite frequently contains such undesirable impurities as zinc, arsenic, lead, copper, tin and nickel.

Although richness of the iron content is the most important factor to consider in evaluating an iron ore, many others also enter into its value or reducibility. In some cases, these other characteristics, chemical and/or physical in nature, may completely offset commercial value of the iron content. In many cases these factors are difficult to reduce to definite properties, and it is only by benefit of practical experience that the blast furnace operator learns to choose the best ores or to work with those that are available.

Both the amount and type of combination of the other elements, called the gangue, are important considerations which may either increase or decrease the ore's desirability. The usual impurities are, silica, as free silica or combined silicates, alumina, phorphorus, managanese and sulphur. Other elements which are not generally present, but which occur in some deposits are zinc, arsenic, lead, copper, nickel, chromium and titanium.

Some of these impurities, such as alumina and the strong basic oxides of calcium, magnesium, sodium and potassium are not reduced in the blast furnace. Calcium and magnesium oxides are very beneficial because of their fluxing properties and, if present in sufficient quantity as in the Clinton ore of Alabama and in some siderite deposits, no additions of flux may be required for slag formation. Since alumina increases slag fluidity, up to a certain limit it is beneficial. In fact depending on the silica content, too little alumina may be detrimental. Alkalies, such as sodium and potassium, within reasonable limits, have no effect upon furnace operation except to increase the solid content of blast furnace gas.

TABLE IV
COMPARISON OF TONNAGE SHIPPED AND ANALYSIS VARIATION FOR SELECTED YEARS OF LAKE SUPERIOR ORES FROM 1902 TO 1947

Year	Amount Shipped in 1000 Gross Tons	Analysis, % Iron	Phosphorus	Silica	Manganese	Moisture
1947	77,210	50.91	0.093	9.09	0.75	11.28
1945	75,207	51.69	0.089	8.52	0.72	10.96
1940	63,308	52.09	0.085	8.00	0.77	10.93
1935	28,214	51.44	0.093	8.93	0.79	10.75
1930	46,699	51.33	0.095	8.70	0.82	10.92
1925	54,784	51.74	0.099	8.42	0.82	10.58
1920	57,938	51.69	0.103	8.13	0.77	11.09
1915	45,883	51.49	0.100	8.14	0.64	11.29
1910	42,366	51.68	0.092	7.97	0.66	11.06
1905	33,675	54.14	0.082	6.37	0.50	10.20
1902	26,777	55.39	0.075	6.23	0.46	8.71

Other impurities, such as silica, sulphur, titanium, manganese, chromium and cobalt, are partially reduced in the blast furnace. Consequently some of these, if present, will enter the pig iron. Although silicon, the most common impurity can be closely controlled by the slag basicity and temperature, a higher silicon content, which requires more flux for proper slag formation, is undesirable. Because of the increased flux requirements, slag volume and coke consumption are also increased. Amount of sulphur in the pig iron, which is a highly undesirable element because of its harmful effects on finished steel, can be regulated to some extent by proper control of the slag basicity and furnace temperature. There is a definite limit to the amount of sulphur permissible in the ore without roasting to remove it. Between 50 to 75 per cent of the manganese in the ore will be reduced and enter the pig iron. For steelmaking purposes, manganese, within certain limits, is desirable, particularly in the open hearth process to assist in sulphur removal. For each steelmaking process, open hearth or bessemer, there

Fig. 5—Tremendous stockpiles of ore and other raw materials must be on hand at all times if the blast furnace is to keep in continuous production

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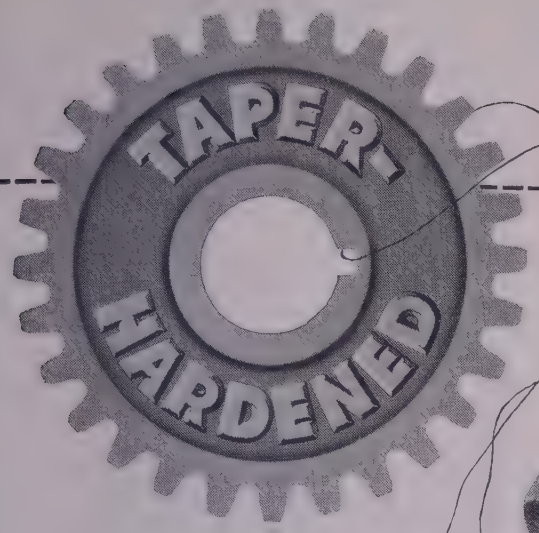
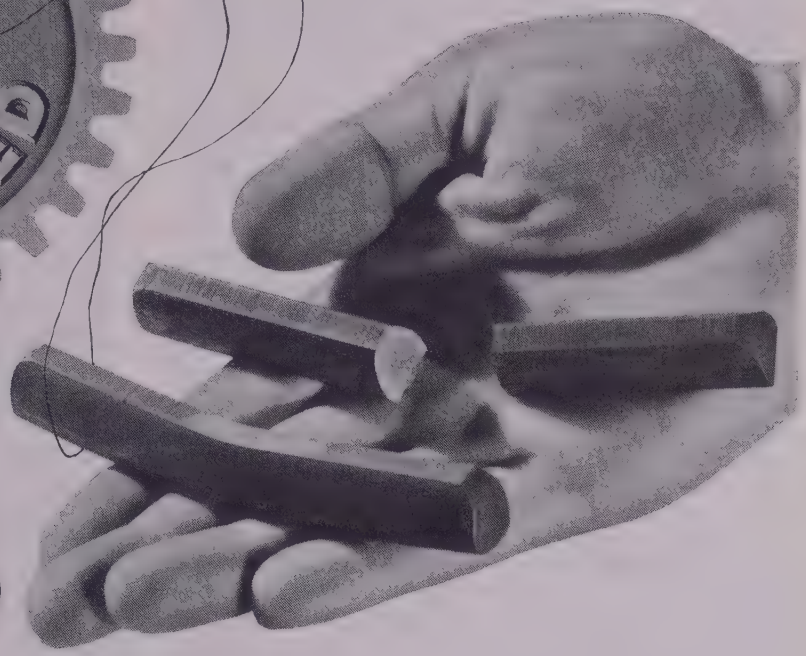
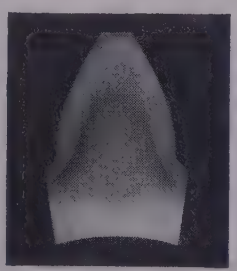


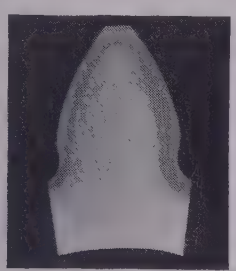


Hard and Tough

this "taper-hardened" tooth bends before it breaks



Taper-Hardened Tooth Section



Case-Hardened Tooth Section

The taper-hardened tooth above bent under the same force that snapped the case-hardened tooth. Yet a test will show wearing surfaces of nearly equal hardness.

The cross sections at the left show why taper-hardened gears have resilience and life under their hard surfaces—why they last longer in punishing service—why they "roll with the punch". Notice the graduated hardness in the taper-hardened tooth—blending down the scale from maximum hardness at the surface to toughness at the ductile core. Compare it with the thin, brittle, shell-like hardness of the case-hardened tooth in which there is no give, no bend.

No wonder "taper-hardened" BP gear steel makes gears last so long.

For complete information on taper-hardening, write for free copy of "BP Gear Steel" B-4395, Westinghouse Electric Corp., Dept. 119, P.O. Box 868, Pittsburgh, Pa.

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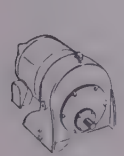

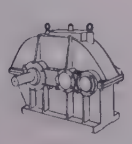

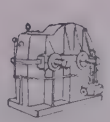

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TABLE V

AVERAGE ANALYSIS LAKE SUPERIOR ORES 1947

Grade of Ore	Shipments in 1000 Gross Tons	% of Total	Analysis in Percent				
			Iron	Phosphorus	Silicon	Mang.	Moisture
Bessemer	10,586	13.7	53.30	0.038	9.44	0.40	9.63
Low Phos. Non-Bess.	58,872	76.3	50.99	0.072	8.66	0.68	11.80
High Phos. Non-Bess.	4,568	5.9	50.76	0.408	7.90	0.35	9.47
Magniferrous	2,551	3.3	42.69	0.236	12.04	4.74	11.45
Siliceous	593	0.8	37.15	0.045	42.16	0.09	2.93
Aluminiferrous	40	0.0	39.36	0.059	14.33	0.42	14.89
Total	77,210	100.0	50.91	0.093	9.09	0.75	11.28

Source: Lake Superior Iron Ore Association.

is a definite allowable maximum limit. Consequently ores used in the blast furnace burden must be balanced in terms of manganese content.

Among impurities which are always reduced in the blast furnace are phosphorus, arsenic, copper and nickel. Since phosphorus is always present in the ore and since 100 per cent of the ore's phosphorus goes into the pig iron, the phosphorus content of the pig iron can only be regulated by controlling phosphorus content of ore charged in the blast furnace. Phosphorus is normally harmful to finished steel, and, since the acid steelmaking process, either open hearth or bessemer, does not remove phosphorus, pig iron for that type process must be low in phosphorus. In the basic process, the prevalent open hearth method, phosphorus is removed during refining of the pig iron. Consequently, although low phosphorus pig iron is desirable, it is not essential for most products. Other elements such as copper and nickel which are reduced into the pig iron may be used to advantage in production of certain low alloy steels. Zinc and arsenic are very harmful, since they tend to volatilize and corrode both furnace lining and shell.

Besides the composition and amount of gangue in the ore, its physical characteristics affect reducibility. Neither soft, fine nor hard, lumpy ores are desirable. Soft ores, such as from the Mesabi, tend to choke up the furnace and produce an excessive amount of flue dust. On the other hand, large lumps tend to promote furnace channeling and are difficult to reduce because of their small surface area in relation to weight. Porosity of the ore, which is related to its density, is an important factor affecting the surface area and the ore's reducibility. Decrepitation properties, which are a function of the amount of combined water and carbonate, are a factor in the amount of flue dust produced. In addition, an ore which has a tendency to fuse is difficult to reduce.

Percentage of moisture in the ore may vary from practically none to as high as 25 per cent. Limonite ores are the worst offenders, although moisture content in hematite may run as high as 15 per cent. This water content is undesirable, since it decreases iron content per ton of ore with resultant higher freight charges per unit of iron delivered at the furnace.

During the past 25 years, much attention has been given to the problem of improving raw materials supplied to the blast furnace. Two factors, the gradual exhaustion of high grade Lake Superior ores and a better understanding of the actual mechanism of blast furnace reduction processes, have been responsible for this interest in beneficiation of iron ore. Beneficiation is a general term which covers any treatment of the ore to improve its physical structure or properties and chemical composition for blast furnace use. Processes used can be either mechanical, chemical or a combination of both, and are as follows: Crushing for breaking up large lumps, screening for separating by sizes, washing for removing impurities such as clay and sand, drying for removing moisture, concentration by a magentic or a specific gravity process for removing impurities, roasting for removing impurities and partial reduction, sintering for agglomerating fine particles and partial reduction, and nodulizing for agglomerating fine particles.

Amount and type of beneficiation depends to a large extent upon inherent physical and chemical properties of the ore deposit. Since control of the ore's particle size in charging increases iron production with decreased coke consumption, it is now common practice at most mines to crush and screen ores. In most cases, the fines are either nodulized or sintered. Concentration of ores to enrich their iron content has also become an important factor. All magnetite produced in the eastern districts of New York and Pennsylvania is concentrated magnetically and sintered. In addition, the amount of ore from the Lake Superior region which is concentrated by the relatively simple processes of crushing, washing and separation on jig tables has been gradually increasing. Table VI shows how the amount and per cent of Lake Superior ore beneficiated has increased over the past 20 years.

However, the real beneficiation problem that faces the Lake Superior mine operators is in treatment of the vast reserve of some 50 or more billion tons of unaltered taconite which contains from 25 to 35 per cent iron. Approximately 20 per cent of this taconite is magnetic iron oxide (Fe_3O_4), and the balance is nonmagnetic Fe_2O_3.

In either case, taconite must be crushed and ground very fine so that the intimate gangue, mainly silicates, can be removed. For magnetic ore, a simple

TABLE VI

PER CENT ORE BENEFICIATED IN 1000 GROSS TONS ON TOTAL TONNAGE SHIPPED FROM ALL U. S. MINES

Period for Yearly Average	Total Shipments	Amount Beneficiated	% Beneficiated
1925–1929	66,697	8,654	13.0
1941–1945	95,462	20,498	21.4

Information obtained from material supplied by the Mineral Industries—U. S. Census.

Blast furnace drawing courtesy of Arthur G. McKee Co., who also supplied photographs together with the following organizations: United States Steel Corp., Republic Steel Corp., Armco Steel Corp., Caterpillar Tractor Co., and Oliver Iron Mining Co. American Iron & Steel Institute supplied drawing showing materials used in furnace and stove construction.

magnetic separation can be made. With nonmagnetic ore, one of two methods may be used. The ore may be roasted, which partially reduces the iron oxide from Fe_2O_3 to Fe_3O_4 and makes it magnetic, or various types of flotation processes may be employed. For the roasting process, a large amount of gas must be available, and such is not the case, at present, in the vicinity of the mines. Thus far, although the iron recovery in flotation processes has been good, this method has not been successful because of the high silicon content in the concentrated product. The product of taconite concentration is so fine that it must be agglomerated by sintering or nodulizing to make a satisfactory blast furnace raw material.

Flue dust consists mainly of iron ore fines, coke breeze and limestone dust. As such it is not suitable to charge directly back into the blast furnace. However, because of the excess coke, flue dust makes a good raw material for sinter when mixed with fine ore and roll scale.

Roll scale is almost pure iron oxide with a little grease, sand and dirt. Coarse roll scale, such as the product of heavy rolling mills, can be charged directly into the blast furnace. Fine scale from finishing mills should generally be sintered before charging.

The blast furnace can use any type of iron and steel scrap that will pass the stock house gates and bell openings. Miscellaneous scrap such as borings and turnings, which are too fine for open hearth use are satisfactory in the blast furnace, if not so fine as to go into the flue dust. Other types of suitable scrap are clinkers from soaking pits, ladle scrap, runner scrap, bessemer spittings, slag scraps from slag crushing plants and crop ends.

Open hearth slag is profitable for its manganese, lime and iron contents, but for certain types of products its use is debatable. However, it can be used up to as high as 10 per cent of the burden.

(*To be continued*)

RF Welder Making Continues

EFFECTIVE date of a proposed order respecting radio interference which would affect the development and use of electric arc welding devices utilizing radio frequency energy as part of the welding process has been postponed by the Federal Communications Commission until Jan. 31, 1950. Under consideration since April, 1948, the postponement of the proposed rules allows the continued manufacture and sale of high frequency stabilized arc welding equipment for the next 6 months.

Postponement was granted to provide more time for further investigation of high frequency stabilized arc welders and for further study of high frequency radiation from this apparatus. In this welding process, high frequency current is used to stabilize inert gas shielded arc welding, particularly in the welding of aluminum and magnesium.

Negative Force Deformation

WIDE influence on the mechanical design of many products is expected to result from the appearance of an elastic member which, contrary to accepted engineering principles, resists less the more it is deformed. Developed by W. J. Cook of Hunter Spring Co., Lansdale, Pa., the new device, called the Neg'ator, has four other peculiar properties of significance: Enormous expandability and range of action up to 50 times any original dimension; ability to act around corners and through small openings; high initial force in resisting the very first increments of deflection and the ability to store and deliver approximately twice as much energy as other types of springs occupying the same space.

The company, which has set up a Neg'ator Division, has stated that already ten basic fields of usefulness have appeared. They are: As a spring (extension or compression), self-adjusting clamp, clip, wrapping, precision force adjustment, transducer or converter of energy from one system to another, automatic coiling device, friction band, telescopic tube form and as a means of transmitting power or motion.

It is stated that the secret of the new spring lies in prestressing each successive increment of length of a flat strip of spring stock by a predetermined but not necessarily constant amount. In its relaxed position it forms a tight coil, each turn pressing in on the others. In use, it is progressively unwound or drawn out like a tape rule over its range of action. Its resisting force is developed as each successive length of the metal strip is drawn off the coil and is straightened thereby. The force required to do this varies inversely as the radius to which the metal strip has been prestressed at that point. The smaller the radius the greater will be the force.

If the Neg'ator is heavily prestressed near the free end and only lightly prestressed further along the coiled length, the device will pull back more at the beginning of its range of action than at the end of its range of action— exhibiting a negative force-deflection characteristic. If uniformly prestressed along the strip length, the resistance of the coil to extension is uniform and constant irrespective of the extension. Only the short section of the stock which lies in the partially straightened zone between the tight coil and the fully straightened tail produces the resisting force at any time.

Aids to Management

AVAILABLE from American Management Association, 330 W. 42nd St., New York 18, N. Y., are eight booklets in the association's packaging, insurance, personnel, office management and general management series. Titles of the booklets, available for a nominal fee, are as follows: Cost Controls for Packing, Shipping and Warehousing; A Primer on Basic Types of Shipping Containers and Interior Packing Pieces; Advances in Insurance Coverage — Accident Prevention and Control; Executive Personality and Job Success; Personnel Functions and the Line Organization; Appraising and Training Office Supervisors; Worker Morale and Productivity; and Organization Controls and Executive Compensation.

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Prescribed Lubrication

(*Concluded from Page* 109)

are the chief causes of impaired lubrication. The cables, gears, bearings, hoists and trolleys of all the mechanisms are periodically exposed to the extreme heat of molten metal and hot gases which arise from the molten steel during tapping. This applies particularly to the cables holding the hooks which raise the ladles. Lubricants which are not specially refined will tend to dry up and lose their effectiveness rapidly under these conditions.

Where induced draft fans force the hot gases from the open hearth through a series of waste heat boilers, the lubrication of the bearings of these fans also can become difficult due to the heat from the hot gases which is conducted by the shaft to the bearings. These fans are usually motor driven, being equipped with watercooled, ring-oiled bearings. Relatively high viscosity engine oil, or even in some cases a steam refined cylinder stock must be used to meet conditions and afford the necessary lubrication.

The electric furnace consists of a bowl-shaped steel shell suitably lined with firebrick or other refractory material. To the bottom is attached a toothed rocker which meshes with a rack. Thus the furnace can be tilted for pouring by setting in motion the operating motor which manipulates the furnace through a connecting rod and a reduction gear.

Less Dusty Operation Encountered—The usual mechanisms which will require lubrication in the electric furnace are the rack and gear teeth, the bearings of the operating motor and connecting rod and the electrode hoist winches. A considerable number of such parts are involved. In general, heat conditions will not be quite as severe, nor will these mechanisms be subject to as dusty operation as elsewhere in the mill. Therefore, the usual lubricants specified heretofore for similar mechanisms will function with perfect satisfaction, in fact, will last longer and give better service than when operating conditions and temperatures are more severe.

Although but a fleeting picture of the smelting and refining branches of the steel industry has been given, it is felt that sufficient has been said to bring out the particularly important part which is played by lubrication. To be true, the average equipment is rough and massive and first glance would lead one to believe that lubrication is not a serious matter, but the operating mechanisms of these massive units must be accurately designed and machined, since they are so interdependent upon one another. In effect, the principles of good machine work must be incorporated in the steel mill as everywhere else in industry, if efficient production is to result.

Accordingly lubrication of moving or rubbing parts becomes of the most vital importance, for in company with the usual problems of pressures and clearances, heat, dust and dirt are encountered in their most aggravating form.

Boiler Ratings Revised

PROPOSED revision of simplified practice recommendation R157-37, steel horizontal firebox heating boilers, will enlarge upon the scope of the recommendation to include a simplified and uniform list of ratings for residential steel boilers, oil-fired, in terms of steam and water radiation and Btu per hour, according to Commodity Standards Division, National Bureau of Standards, Washington 25, D. C. The proposed revision, if found generally acceptable, will be effective at a later date, the bureau states.

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New Books

Metal Statistics 1949, edited by N. J. Langer; cloth, 800 pages, 4¼ x 6¼ inches; published by American Metal Market Inc., New York, N. Y., for $2.00.

This 42nd edition contains the same general assortment of statistical information on ferrous and nonferrous metals, as well as miscellaneous economic subjects, as was supplied in previous issues. According to the editor, a few new tables have been added and various sections have been expanded and refined. Prices given are generally based on the quotations published in *American Metal Market* and are representative of wholesale selling prices.

Production and consumption statistics have been gathered from authentic sources, some of which are American Iron & Steel Institute, American Bureau of Metal Statistics, U. S. Bureau of Mines, Bureau of the Census, Copper Institute, American Zinc Institute, Lead Industries Association and the Tin Research Institute. Incorporated in the pocket-size volume is a detailed table of contents, a buyers' directory and an index to advertisers.

—o

Making Conference Programs Work, by M. F. Stigers, associate professor of trade and industrial education, Purdue University; cloth, 256 pages, 6¼x9¼ inches; published by McGraw-Hill Book Co. Inc., New York, N. Y., for $3.50.

Book takes the reader through every step of modern conference procedure, explaining the basic techniques that make possible the conducting of an informal conference effectively. Different types of conferences, how to make physical arrangements according to size and purpose of the conference, how to handle cross table discussions and use visual aid effectively and what to do and say from the beginning until the end of the conference are covered.

Feeling that many organizations, most of them industrial, are using conferences without a well matured plan, the author has sought to fit the conference program into an organization wide training and education program and develop plans on how to make the best use of conferences through his suggestions. The book is divided into three parts: Information sheets; how to train conference leaders; how to use a conference program; and statement and

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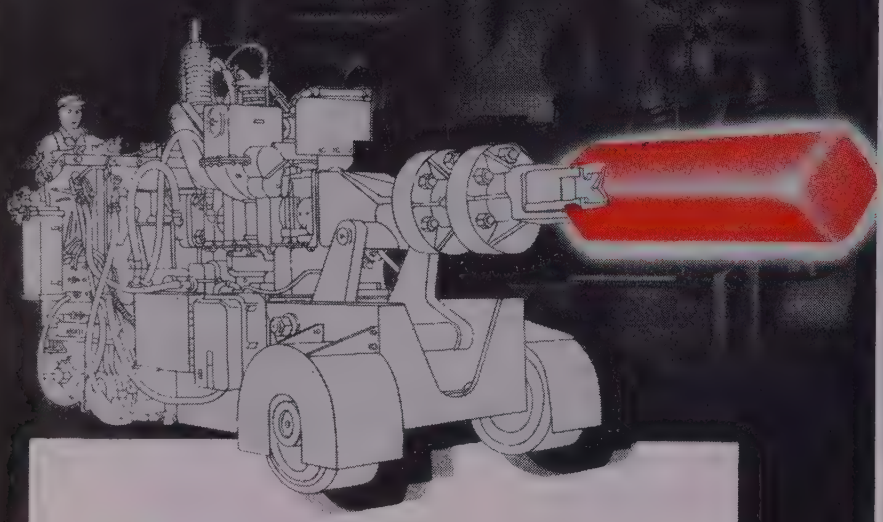

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typical conference reports. A large number of authentic reports of actual conferences help make the book a guide on conference leadership and the use of conference programs.

—o—

Oxygen Cutting, by E. Seymour Semper; cloth, 150 pages, 5½ x 8½ inches; published by Louis Cassier Co. Ltd., London.

Approach to the subject of oxygen cutting in this book is mainly practical, although the theoretical side is not neglected. It is stated by the author that the process of oxygen cutting is now firmly established as an engineering operation and that the object of the book is to assist the engineer concerned with cutting and shaping material. Since the inception of the process over 40 years ago, cutting by oxygen has been known as oxyacetylene cutting, gas cutting, flame cutting or sometimes just as burning. None of these terms is sufficiently descriptive or accurate, the author states.

Contained in the book are over 100 photographs and diagrams as well as several tables and a bibliography. Among the subjects covered are construction and use of guiding templets for machine cutting, factors affecting accuracy of cutting, thermal effects of cutting on mild and alloy steels, portable machines, manual cutting, the oxygen lance and deseaming and gouging.

—o—

Treatise on Powder Metallurgy, Volume I, Technology of Metal Powders and Their Products, by Claus G. Goetzel, vice president and director of research, Sintercast Corp. of America; cloth, 6 x 9 inches, 806 pages; published by Interscience Publishers Inc., New York, N. Y., for $15.

Twenty chapters of principles, history, theory, experiment, technology, properties, production and application are contained in this encyclopedic type book which may be used as a text, reference book or source for new applications. Fundamentals covered equip the reader to understand the most recent evolution of the art, such as structural iron and steel components, infiltrated powder metal products, superalloys, new magnetic materials and combination materials.

Book starts at the beginning of the subject of defining words and explaining the terminology of the powder metallurgist. Following chapters on basic principles and history, there are chapters which describe methods of powder production, characteristics, properties and standards of available powders, methods of testing powders, powder

conditioning and the function of addition agents. Underlying principles of powder compaction are given full explanation.

Methods of fabrication and equipment used are discussed in detail as are die and punch materials and designs, capacities, constructions and operating principles of presses, principles, apparatus and techniques of hot pressing. Also included is information on the sintering process. Three final chapters relate to the operations that follow sintering: Plastic deformation; deformation by cold working and by hot working, resintering, softening, hardening; and finishing treatments such as surface protection, impregnation treatments, joining, shaping and surface cleaning. Volumes II and III will be available shortly.

—o—

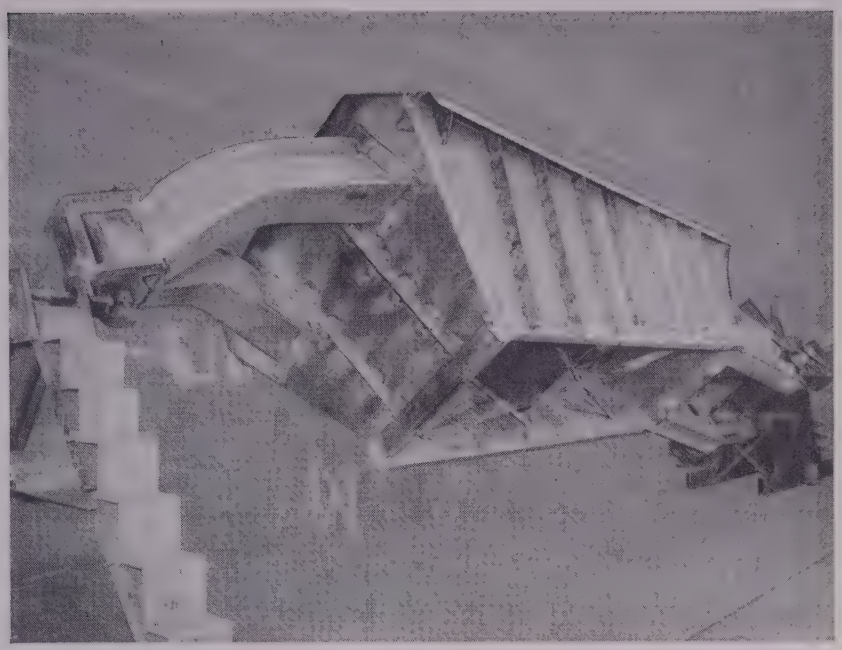
Induction Heating, by N. R. Stansel, fellow, American Institute of Electrical Engineers; cloth, 212 pages, 6½ x 9¼ inches; published by McGraw-Hill Book Co. Inc., New York, for $3.50

Electrical and thermal principles of the use of eddy currents for heating service are presented in this book, supported by measurements to provide a factual basis. The samples and illustrations showing how these principles are applied in practice cover the entire range of practice in the heating of metal parts to temperatures below the melting point and in the melting of metals. The book shows the relation of the electric, magnetic and thermal properties of conducted materials (mainly metals), of frequency, and of the dimensions and shapes of the body to be heated.

Primarily fundamental in treatment, this book also indicates the procedures for the development of new uses of this method of heating. Importance of the design of the primary coil, inductor or work coil, of induction-heating apparatus is emphasized from the viewpoint of practice. The book is well illustrated with photographs, line drawings and has a considerable number of tables and graphs.

—o—

HARDENABILITY of alloy steels is a subject of a booklet in the series *Contributions to the Metallurgy of Steel—No.* 11, published by American Iron & Steel Institute, New York. Included are chapters on hardenability bands—H-steels, standard end-quench hardenability test procedure, selection of automotive steel on the basis of hardenability and hardness conversion numbers. The 176-page booklet has many charts and tables as well as an index.



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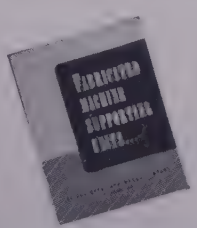

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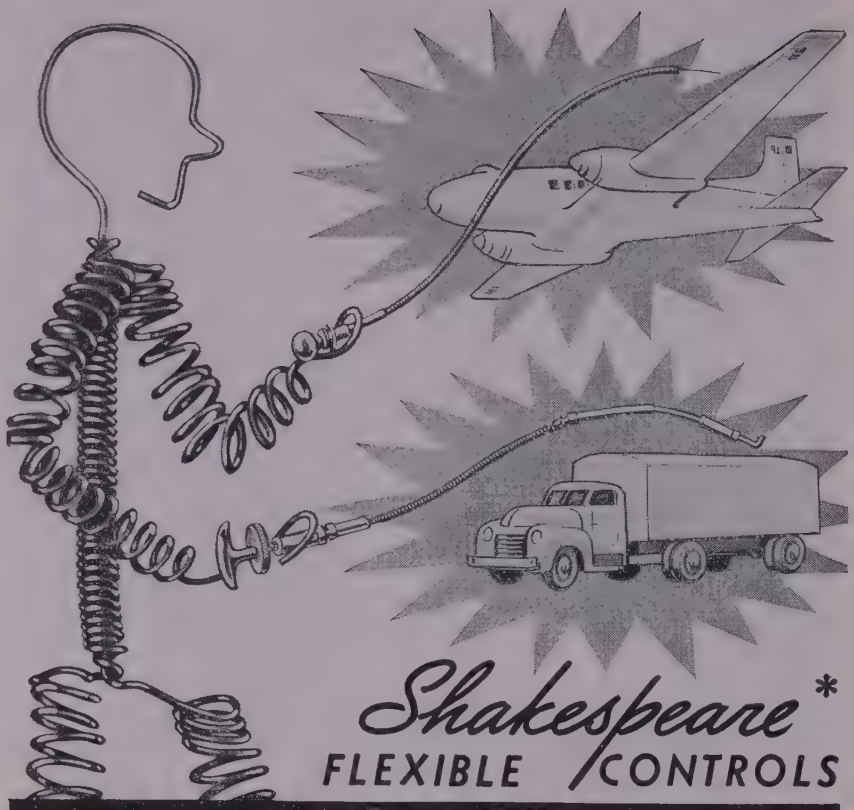

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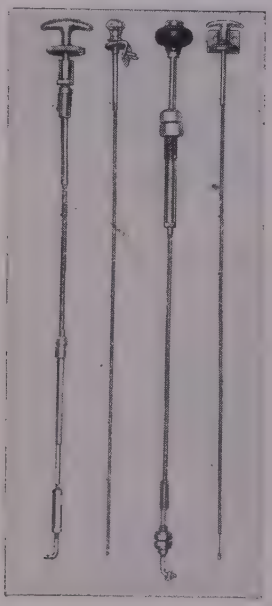

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Priming Paint Test Reported

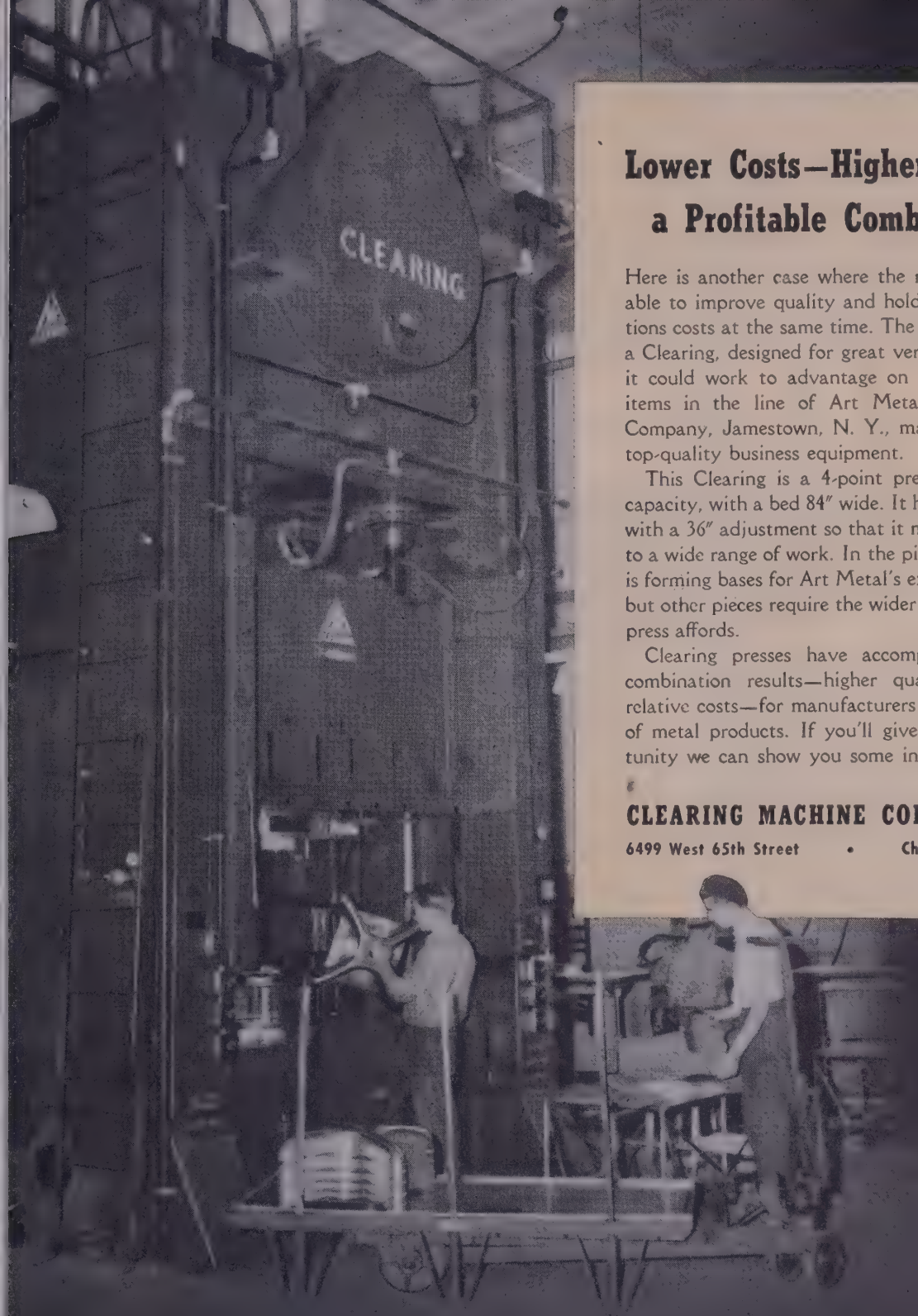
ABILITY to retard rust for at least one year was one of the desired specifications sought in a series of tests on several types of primers to prevent structural steel from rusting in the interval between shop priming and field painting. Test objectives also were to find a primer which would require only standard wire brush cleaning prior to painting, one which would be quick-drying so that steel could be handled within 8 hours after painting, a formula which would be open so that it could be supplied by a number of manufacturers and a primer which would have good application properties. These tests, made

ARE YOU PRODUCING NODULAR IRON?

BELOW are a few recommendations advanced by Vanadium Corp. of America, New York, applying to the use of magnesium alloy* for producing nodular iron:

1. Carbon should be as high as possible, preferably well over 3.50 per cent.
2. Silicon, which gives the best machinability, is in the range from 1.60 to 2.00 in the base iron.
3. Manganese should be held as low as possible if "as cast" ductility is desirable.
4. Phosphorus does not interfere with making of nodular graphite, but adversely affects elongation and strength. It should be as low as possible.
5. Sulphur affects efficiency of treatment by requiring a part of the magnesium for removal. It should be under 0.10, if possible.
6. Alloy can be added to the stream or placed in bottom of ladle immediately before stream starts.
7. Iron should be stirred to insure complete contact with any remaining alloy, after action is apparently complete.
8. Recovery of magnesium will be inversely related to the temperature of the iron at addition time. A tempearture of 2600 to 2650° F is suggested.
9. At 0.04 sulphur, an addition of 0.12 magnesium is suggested, adding 0.01 per cent magnesium for each 0.01 per cent sulphur over the 0.04 mark.

* Quoted magnesium and silicon contents of the alloy produced by the Vanadium Corp. resemble those of the Myskowski-Dunphy alloy, STEEL, p.82, Sept. 5, 1949, under production by Electro Metallurgical Co., New York.



Lower Costs—Higher Quality a Profitable Combination

Here is another case where the right press was able to improve quality and hold down productions costs at the same time. The right press was a Clearing, designed for great versatility so that it could work to advantage on many different items in the line of Art Metal Construction Company, Jamestown, N. Y., manufacturers of top-quality business equipment.

This Clearing is a 4-point press of 350 tons capacity, with a bed 84″ wide. It has a 24″ stroke with a 36″ adjustment so that it may be adapted to a wide range of work. In the picture, the press is forming bases for Art Metal's executive chairs, but other pieces require the wider bed which this press affords.

Clearing presses have accomplished similar combination results—higher quality at lower relative costs—for manufacturers of many kinds of metal products. If you'll give us the opportunity we can show you some interesting facts.

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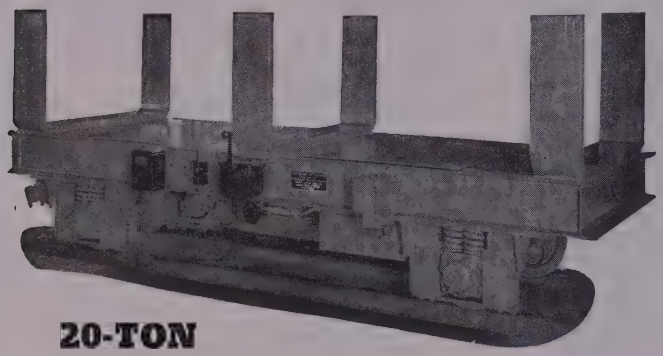
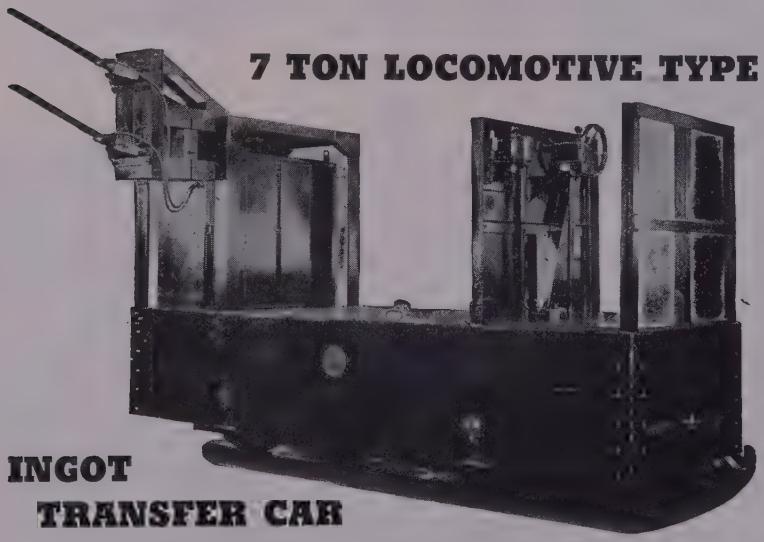


20-TON CAPACITY

For handling long bars. Powered by storage battery. Geared to travel at walking speed when controller is held in operating position. Automatic return to "off" when released and magnetic brake is set.

7 TON LOCOMOTIVE TYPE



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Operator station in elevated position at one end of car with magnetic switch control located at opposite end. Car is provided with hydraulic brake system with anti-friction roller bearings. Spring mounted journals.

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by Bethlehem Steel Co., New York Central Railroad System, New Jersey State Highway Department and research laboratories of National Lead Co., were reported in a paper presented at the fifth annual conference of the National Association of Corrosion Engineers at Cincinnati in April, by S. C. Frye, research department engineer of Bethlehem Steel Co.

Tests were made on 12-inch lengths of ⅜ x 4 x 4 inch structural steel angles which were selected because it was known that scale on the angles is typical of mill scale found on structural steel. Four types of surfaces were selected for testing, as follows: Hot rolled steel with mill scale reasonably intact, less than 10 per cent of surface rusted; hot rolled steel allowed to weather until 30 to 50 per cent of surface was rusted; hot rolled steel allowed to weather until 60 to 80 per cent of surface had rusted; hot rolled steel pickled to remove all of mill scale and provide rustproof surface. Also tested was the effect on primer paint life by pretreatment by a wetting agent compatible with subsequent primers. Several series of test panels were prepared by treating the angle surfaces with a film of raw linseed oil or modifications of linseed oil, prior to paint application.

Paints Applied in Two Thicknesses

Paints were applied in normal and controlled film thicknesses. Normal thickness was by judgment of an experienced operator and controlled thickness by application of a predetermined amount of paint to obtain a uniform dried film thickness of 2.0 mils plus or minus 10 per cent. A total of 56 angles were exposed at 45 degrees, facing south.

Inspection at the test sites of Perth Amboy, N. J. and New Kensington, Pa., after 9, 13 and 19 months of exposure revealed that in 17 paints using three types of pigmentation, significant failures of various primers had occurred after 13 months, particularly on corroded or rusted surfaces which were from 30 to 80 per cent rusted.

According to Mr. Frye, these surfaces are typical of or slightly poorer than the majority ofstructural steel surfaces to which primer paints are applied. The test also showed that the hot rolled steel with mill scale reasonably intact and less than 10 per cent of the surface rusted showed very little failure, as did the pickled surface.

After 19 months exposure, it was reported that 100 per cent red lead in linseed oil was the primer which afforded best protection, based on average rating for a controlled film

thickness of 2.0 mils and also for normal method of application. This primer did not, however, meet requirement of the specifications in that it took longer than 8 hours to dry. It was also stated that average film thickness of red lead in linseed oil paint was considerably greater than for other paints applied.

Of the primers that met the 8-hour dry requirement, best protection on the 30 to 80 per cent rusted surfaces was obtained throughout the test with a pigment combination of 60 per cent red lead, 20 per cent iron oxide, 14 per cent magnesium silicate, 6 per cent mica, in 34 per cent phthalic anhydride linseed oil glyceryl phthalate resin, or with 100 per cent red lead, in 30 per cent phthalic anhydride linseed oil glyceryl phthalate resin thinned with 2 per cent, by volume of a 1:1 mixture of naphtha and kerosene. Pretreatment of rusted metal surfaces showed raw linseed oil performed best on a number of tests.

It was reported that in view of results obtained, further tests to cover a wider field of primers are contemplated by the committee. Bethlehem Steel Co. reports a considerable success with a 75/25 red lead/iron oxide pigment combination as a shop coat as reported in the paper. Tentative specification for this primer with either a glyceryl phthalate linseed oil modified resin or a phenolic resin chinawood oil—linseed oil varnish, as a vehicle has been set up.

Offered as Power Units

HERCULES Motor Corp., Canton, O., is making available its DIX4 series of 4-cylinder diesel engines as closed type power units for use as a power source in various fields. Engines are built in two bore sizes, one with a 3¼-inch bore and 4-inch stroke and a piston displacement of 133 cu in.; the other with a 3⅝-inch bore and 4-inch stroke with a piston displacement of 166 cu in. Both are solid fuel injection, compression ignition, 4-stroke cycle type and have torque characteristics that are maintained at a high level over a wide range of speeds.

Sprocket Catalog Available

VARIOUS types of stock sprockets and single and multiple-strand Diamond roller chains carried in stock are described in the 40-page catalog No. 709, published by Diamond Chain Co. Inc., Indianapolis 7, Ind. Data for selection of sprockets and chains is given, plus illustrations, dimensions and prices.

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FOLLANSBEE POLISHED BLUE STRIP will give you real action in the production-line because it's furnished in coils for feeding right into your automatic machines. For the utmost efficiency and economy in continuous operations try this superior Follansbee Polished Blue in coils—the distinctive color is a real asset in any product.

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FOLLANSBEE POLISHED BLUE STRIP fits into many types of products, figurines or furnishings or fryers. The uniform-blue, high-gloss finish of Follansbee Polished Blue attracts discriminating buyers. In coils for automatic productioneering, and with mechanical and physical specifications to fit your needs, you'll find it worth while to tool for Follansbee Polished Blue and the other Follansbee Specialty Steels.

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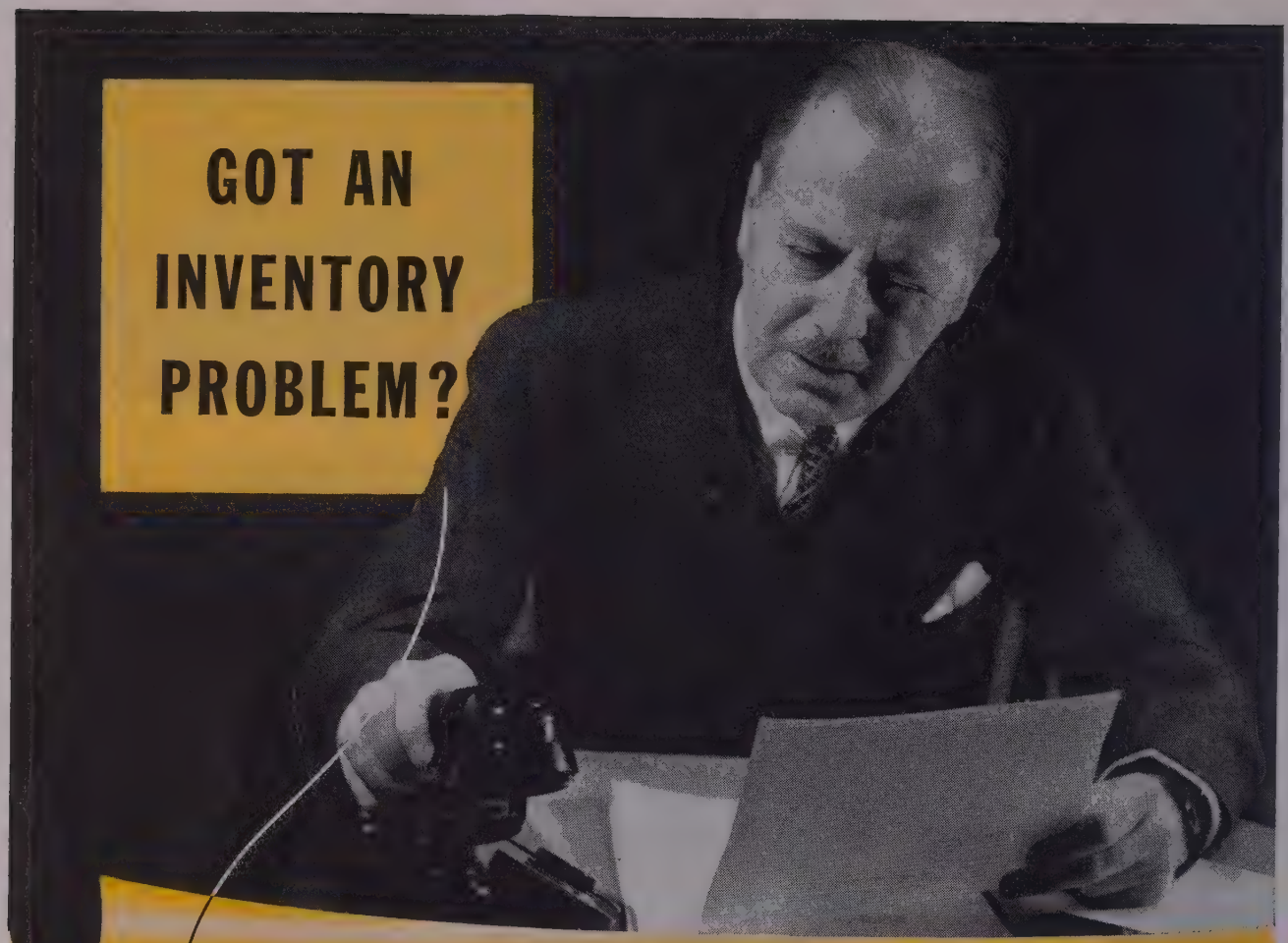
Follansbee Metal Warehouses—Pittsburgh, Pa., Rochester, N. Y., and Fairfield, Conn.



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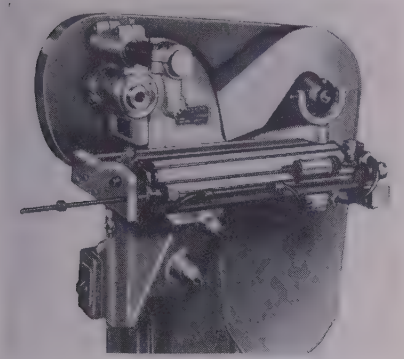
UNITED STATES STEEL

New Products and Equipment

Milling Machine

Eighteen inches of power longitudinal table travel are incorporated in the design of the air-hydraulic feed milling machine for high-speed semiautomatic production, designed by United States Machine Tool Co., Cincinnati 16, O. Speed of the table



travel is adjustable in both directions and cutting speed is infinitely variable.

Automatic pneumatic table feed provides rapid approach, adjustable feed and rapid return. A smooth cut is achieved by the air-cylinder operating against the hydrocheck valve.

Check No. 1 on Reply Card for more Details

Can Tester

Manufactured by the can machinery department of Lima-Hamilton Corp., 60 E. 42nd St., New York 17, N. Y., is an air-pressure tester, de-

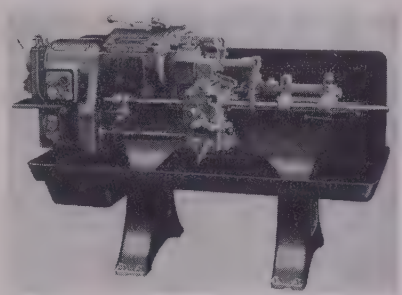
signed with 44 pockets for the high speed testing of round containers. Machine handles cans ranging from 1¾ up to 4¼ inches in diameter and from 2 to 7⅜ inches high. Weight of the unit is 11,500 pounds.

Model 302, with 22 pockets, is for testing larger cans at speeds up to 200 cans per minute. This model handles containers with diameters ranging from 3½ to 7¾ inches in diameter and heights from 2¾ to 12 inches. Each of the models is powered by a 3 hp motor and is equipped with safety devices such as spring-loaded ball slip clutch, brake motor and electric controls.

Check No. 2 on Reply Card for more Details

Pipe Nipple Machine

Chamfering and cutting off of nipples and other tubular products are accomplished at high speed, with practically no lengthwise waste of stock, in an automatic cycle machine made by Bardons & Oliver Inc., 1133 W. Ninth St., Cleveland 13, O. This machine, of heavy duty lathe type, has an antifriction bearing geared head providing six quick changes of spindle speed ranging from 560 to 2280 rpm. This allows



efficient cutting speeds on nipples ranging from 1½ inches down to ⅜-inch. Maximum collet capacity is 2 inches.

To keep pace with high speed cutting, a patented roller feed driven by a separate motor feeds lengths from ½ to 12 inches on automatic cycle. Longer lengths can be fed semiautomatically.

Chamfering and parting are accomplished from cross slides which are cam driven from an apron gear box giving three quick feed changes. The parting tool, which comes in from the front after the chamfering tool has initiated the cut from the rear, is a sharp-edged 5½ to 7-inch disk which rolls against the tubing and "incises" off the nipples cleanly. Average production ranges from 25 of the 1½-inch nipples per minute, up to 80 per minute for the ⅜-inch size, at stock feeds up to 6 inches per piece.

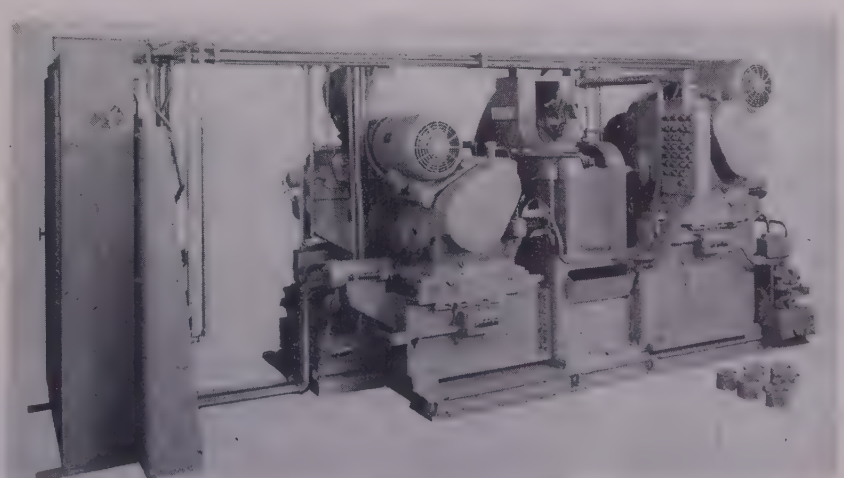
For cutting heavy wall tubing or solid ferrous or nonferrous bar stock, a conventional cutoff tool holder can be substituted for the disk holder.

Check No. 3 on Reply Card for more Details

Multioperation Machine

Taper reaming, chamfering and tapping operations may be performed on 2½, 3 and 4-inch pipe couplings with the model MR 131 machine developed by Moline Tool Co., Moline, Ill. While they are held in the trunnion type fixture, the coupling blanks are taper reamed and inside chamfered from each end and then are tapped from each end. Fixture has two boring stations, two tapping stations and two idle stations, one of which is used for loading and unloading. The two single-spindle, hydraulic feed reaming units are at the front of the machine and each is equipped with its own hydraulic feed pump for rapid traverse in two directions as well as for feed in one direction.

At the rear of the machine are two single-spindle tapping units. A motor driven impeller type pump supplies cutting lubricant to all tools. Control of electrical and hydraulic



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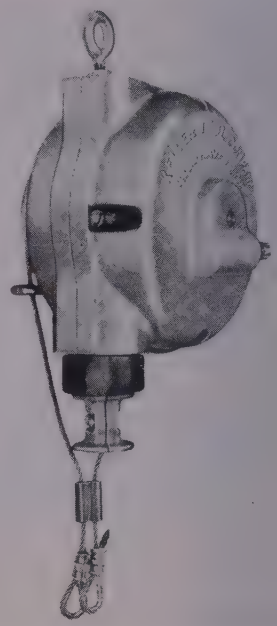
functions of the entire machine is concentrated in a single pushbutton station. Electrical system has the provision for individual control of each reaming and tapping unit for setup and tool adjustment.

Check No. 4 on Reply Card for more Details

Tool Balancer

Keller Tool Co., Grand Haven, Mich., is manufacturing a heavy-duty tool balancer of 20-pound capacity for suspending of tools over work



areas. Balancers materially reduce loss of production time, protect workers from fatigue and eliminate careless tool handling.

Check No. 5 on Reply Card for more Details

Safety Switches

Compact, yet easily wired, are the type A heavy duty industrial service type C standard duty industrial service and type D, general purpose service safety switches announced by Square D Co., 6060 Rivard St., Detroit 11, Mich. A full cover interlock feature on type A switches has an attachment that locks switch "on" or "off". Cover can be closed with up to four padlocks of almost any size and shape. Current carrying parts are silver plated and blades are visible for quick checking of switch operation.

A magnetic plate in the arc chamber cover adds to the high rupturing capacity of the switches. Line terminals are dead front, protected by the hinged arc chamber cover. Non-tracking insulation is used in the base and the insulating cross bar

is formed of melamine. Types C and D switches are similar in appearance and dimensions to type A, with design and construction details differing to meet service demands.

Check No. 6 on Reply Card for more Details

Vibrating Shaker

Used for generating oscillatory linear motions or forces in vibration resonance testing, fatigue strength determinations and in other applications where large vibratory forces over a wide frequency range are required is the electro-dynamic shaker

made by Calidyne Co., 751 Main St., Winchester, Mass. Furnished with carrying handles and trunnion support, the unit can be moved to exert forces in any required direction.

Maximum force rating, at any frequency, is plus or minus 25 pounds. Power output at 60 cycles per second is ⅜-hp. Total weight with trunnion base and handles is 60 pounds and armature weight is 0.66 pounds. Dimensions, less handles, are 9 x 10 x 11¼ inches.

Check No. 7 on Reply Card for more Details

Centerless Shaft Support

Supporting of centerless shafts concentrically in a lathe is made possible by an adjustable collet bushing chuck, announced by South Bend Lathe Works, 390 East Madison St., South Bend 22, Ind. In each shaft from ¼ to 1 inch in diameter may be centered by the chuck, manufactured with No. 2 or 3 Morse taper shanks for use in either the headstock spindle or tailstock spindle of the lathe.

Brass collet chucks can be supplied for round stock in sizes from ¼ to 1 inch by 16ths. A special size col-

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Eleven hard facing electrodes in the M & T line provide the answers to a wide variety of problems in hard surfacing and building up of worn parts.

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The five Aluminum Bronze and two Tool Steel electrodes are for special applications such as building up or facing bearings, tools and dies.

Write for descriptive data.

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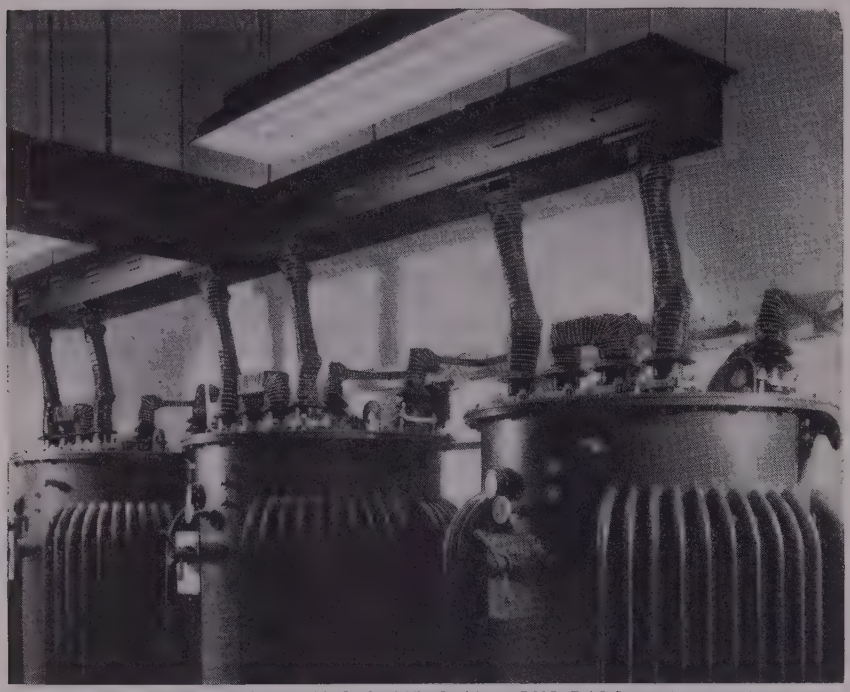

CONNECTORS BETWEEN TRANSFORMERS AND BUS BARS insulated with just one tape — "SCOTCH" Electrical Tape No. 22. Note compact, neat installation — by Buffalo Electric Co., Buffalo, N.Y. — on these three 500 KVA transformers.

One tape does the work of three insulating materials!

Tough, plastic-backed "SCOTCH" Electrical Tape No. 22 replaces three conventional insulating materials—two tapes, one coat of shellac—in modern electrical installations. This tape—or its team-mate "SCOTCH" No. 33 Electrical Tape—gives high dielectric and mechanical strength, together with thin caliper and elasticity. Use one of these new tapes for your next job—on splices or bus bars or wherever you want a quicker, neater more efficient installation. There's a "SCOTCH" Electrical Tape ready to do any one of your jobs *better*. One of our Tape Engineers will be glad to show you how. Write Dept. BW-9 for more information—samples. No obligation.

Quick Facts About "SCOTCH" Electrical Tape No. 22

- **TOUGH** — Plastic backing is abrasion resistant, unaffected by water, acids, alkalies, alcohols.
- **STRETCHY** — 100% elongation at break, conforms snugly to uneven surfaces.
- **THIN CALIPER**—black plastic backing .010 inch thick. For insulating bus bars, cables, high voltage wiring, etc.
- **HIGH DIELECTRIC STRENGTH** — over 7,000 volts.

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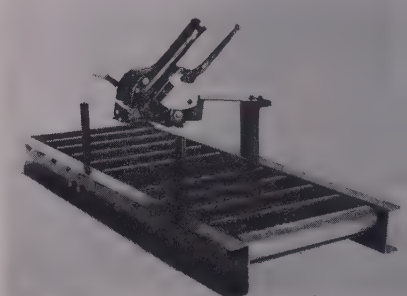
General Export: DUREX ABRASIVES CORP., *New Rochelle, N. Y.*
In Canada: CANADIAN DUREX ABRASIVES LTD., *Brantford, Ontario*

let of 0.637-inch round capacity is available for chucking popular types of generator armatures having shafts of this size. When used in the lathe headstock, chuck may be adjusted to drive the work or, when used in the tailstock, may be adjusted for an accurate running fit.

Check No. 8 on Reply Card for more Details

Strapping Unit

Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill., is offering a conveyor strapping unit which consists basically of a roller section to which has been fastened a rigid mount and a quick-change bracket for the strapping tool. Installation is possible either in the main conveyor line or



at a right angle to it. Countersinking of the unit in a packaging table or bench also may be accomplished. Adjustable vertical stops on the front edge of the conveyor serve to line up the individual pieces for strapping.

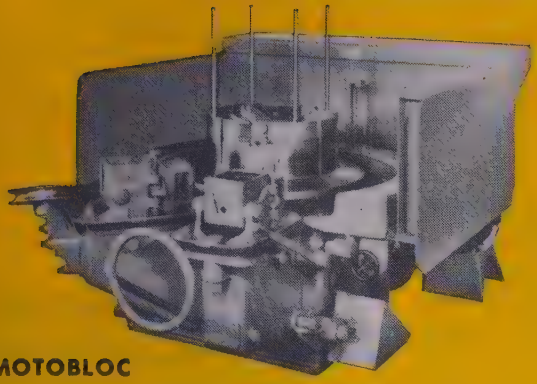
A steel trough in the middle of the E10A3 unit allows a loop of Steelstrapping to be held in such a way that the bundle or package can be moved quickly through the circle and strapped. The rigid mount for the strapping tool may be adjusted for different package heights.

Check No. 9 on Reply Card for more Details

Relaxation Machine

Automatic relaxation tests may be carried out at temperatures up to 1800° F with a record of the rate of decline of load, by means of a 4000 pound capacity machine built by Baldwin Locomotive Works, Philadelphia 42, Pa. Relaxation occurs when a material is stretched to, and held at a given elongation, particularly at elevated temperatures. Creep then tends to elongate the bar and release the load. Elastic shortening balances this effect and total strain remains constant. Plastic elongation can be measured by the decrease in stress.

Machine automatically relaxes tensional loads from as high as 40,000 psi, permitting strain increments of only 2 x 10-6 inch per inch of 6-



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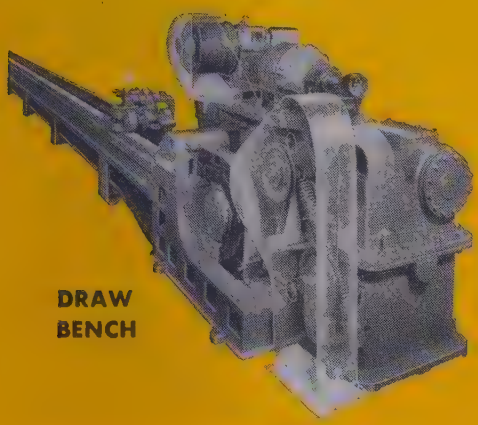
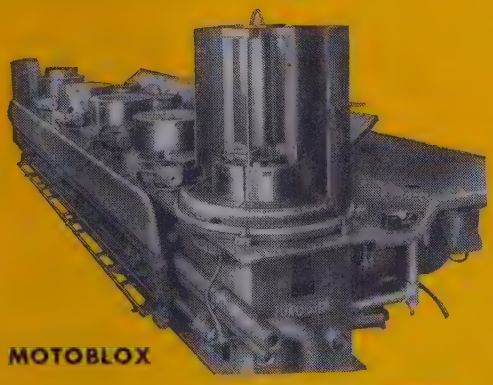


DRAW BENCH



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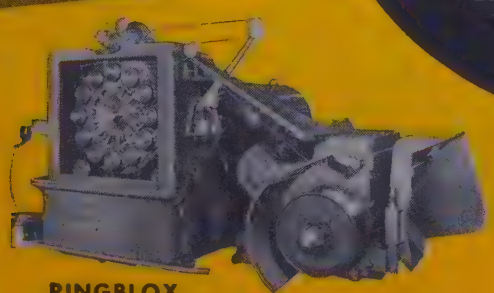

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Tungsten and Molybdenum

to your specifications or you can fabricate in your own plant.

Fabrication processes now available from Fansteel include stamping, forming, machining and assembling.

Thirty-six years of Fansteel's specialized engineering, and every laboratory facility have greatly extended the uses of these high refractory metals for unequaled services with economy, in electrical, electronic and mechanical industries.

Fansteel production assures the utmost in purity. Fansteel metallurgy also integrates the characteristics of tungsten and molybdenum—high melting points, low vapor pressure, resistance to arc erosion and mechanical strength—with the electrical conductivity of silver and copper. Performance and durability for the severest requirements are effected.

Parts, units and complete assemblies can be fabricated by you or will be made complete to your specifications by Fansteel. Consult us on the possibilities of these metals for your applications. Fansteel Metallurgical Corporation, North Chicago, Illinois.

SOME OF THE USES OF TUNGSTEN AND MOLYBDENUM

ELECTRONIC TUBES—tungsten for cathodes, lead-in wires and anodes—molybdenum for grids, anodes, supports.

ELECTRICAL CONTACTS—automotive, ignition, vibrators, telegraph relays, other contacting parts in continuous service.

HEATING ELEMENTS in electric furnaces of temperatures 1600° to 2000° C, above range of other metals.

HEATING ELEMENTS in vacuum equipment where metals are deposited by vaporization. Do not contaminate other metals used in process.

TUNGSTEN is chief ingredient of Fansteel "77" metal for small rotor, flywheels, balance weights, other devices where maximum weight or inertia is required in small space.

TUNGSTEN TARGETS for all types of X-ray tubes.

INERT GAS WELDING—tungsten electrodes sustain the arc, giving longer service.

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RESISTANCE WELDING MATERIALS

Fansteel

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In Controlled Metallurgy

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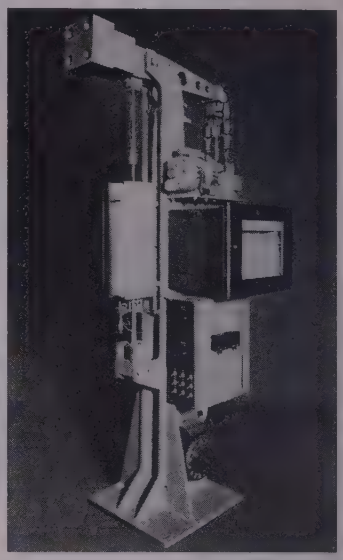
inch gage length of a standard 0.356-inch diameter specimen. Length increases are detected by a sensitive extensometer with electric contacts that close a relay circuit and thus operate a ¼ hp servo motor to reduce the load enough to open the con-



tacts again and maintain a substantially constant strain. Accuracy is held to about 1 per cent of load or 0.25 per cent of capacity. Recorder produces a curve of stress versus time on a flat chart. Furnace measures 2½ x 8¼ to 18½ inches.

Check No. 10 on Reply Card for more Details

Motor Driven Pump

Suction lift from simple circulation work up to heavy duty work against the 150 pounds of pressure is supplied by the general utility close-coupled electric motor-driven gearless pump units, offered by Eco Engineering Co., 12 New York Ave., Newark 1, N. J. Pumps are offered

with ¼, ⅜, ½ and ¾-inch ports. Motors supplied are capacitor start, induction run in single phase models. Three phase motors are also available.

Entire unit is resilient mounted and has an automatic thermal overload relay. Models in ¼, 1/3 and ½-hp are available. Pump is attached to a supporting bracket attached to

the shaft and bell housing of the motor. Motor and pump shafts are in perfect alignment and are connected through a flexible coupling.

Check No. 11 on Reply Card for more Details

Fan Cooled Motor

Designed for operation in nonexplosive atmospheres where metallic and abrasive dusts are prevalent, a line of totally enclosed fan-cooled B-Line motors, developed by Brown-Brockmeyer Co., Dayton 1, O., features cooler operation, smaller dimensions and eliminated dead air

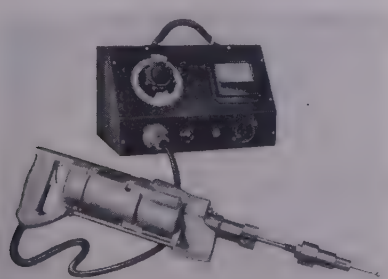
space. Motor windings, as well as the brushes and other internal parts, are protected by the completely enclosed frame. A fan directs air over the stator lamination edges.

Space is saved by utilizing the space between the laminations and the field ring for air cooling. Equipped with life-seal ball bearings which are prelubricated, the motors have a temperature rating of 55° C for continuous duty. They are available in single phase from ½ through 3 hp and in polyphase from ¾ to 3 hp.

Check No. 12 on Reply Card for more Details

Tube Expander Control

An electric tube rolling control, introduced by Airetool Mfg. Co., 396 South Center St., Springfield, O., eliminates the problems of over-expansion which induces cold-worked stresses in the metal and under-ex-



pansion which makes leakage and a rerolling operation. Known as the Airetool-Fisher electric tube rolling control, the equipment uses mechanical means to determine the precise moment when the tube joint reaches

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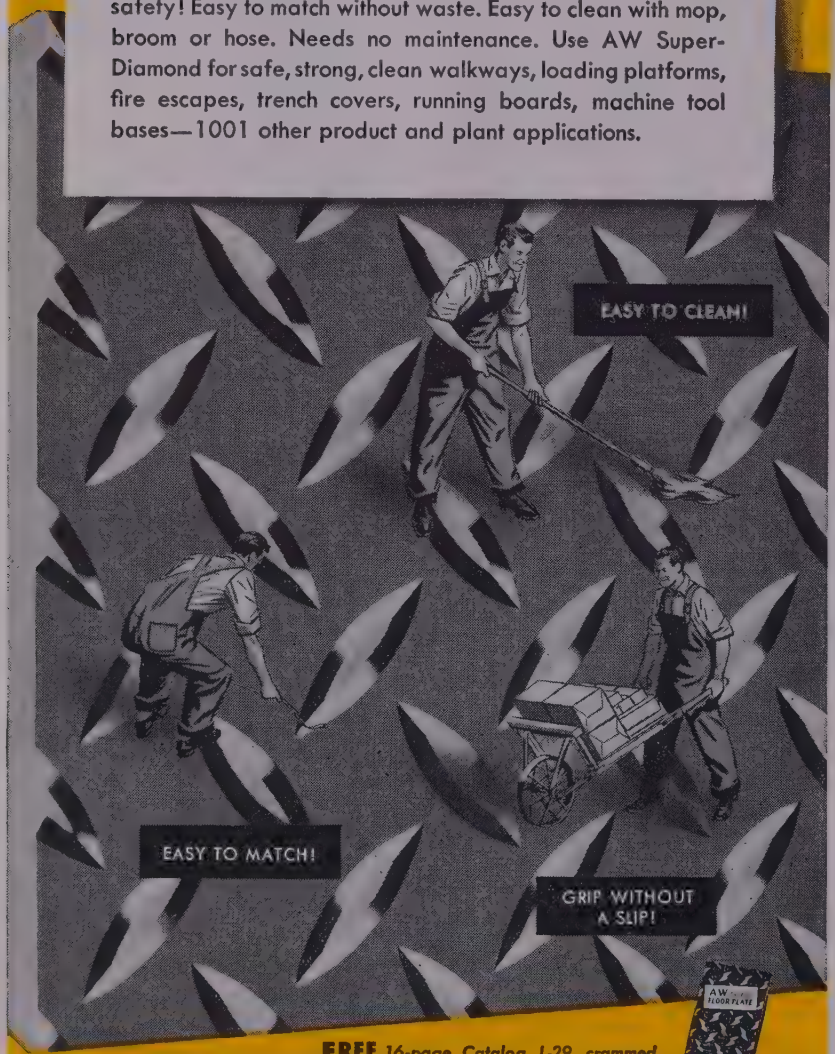
AW SUPER-DIAMOND FLOOR PLATE

A Better Footing for Product and Plant

Put this floor plate in your plant—or on your product—and say goodbye to costly slipping accidents. Even when the surface is wet or oily, exclusive engineered design with Super-Diamonds at 45° angles gives grip-without-a-slip safety! Easy to match without waste. Easy to clean with mop, broom or hose. Needs no maintenance. Use AW Super-Diamond for safe, strong, clean walkways, loading platforms, fire escapes, trench covers, running boards, machine tool bases—1001 other product and plant applications.



FREE *16-page Catalog L-29 crammed with valuable information. Write now.*

AW SUPER-DIAMOND
FLOOR PLATES THAT GRIP

A Product of **ALAN WOOD STEEL COMPANY**
Conshohocken, Pa.

Other Products: Permaclad, Stainless Clad Steel • AW Algrip, Abrasive Floor Plate • Billets • Plates • Sheets (alloy and special grades)

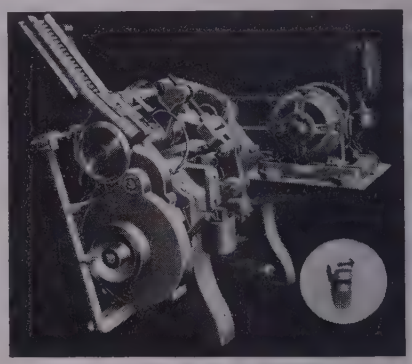
the maximum degree of tightness.

System consists of the controlling mechanism, operated with a dial calibrated for the known expansion "peak" of each type of metal, an electric expander driving motor and either a G-800 or G-1200 ball-bearing type condenser and heat exchanger tube expander. After plugging into an electrical outlet, the dial is turned to the setting which has been predetermined by tests for the type of metal to be rolled. When the maximum torque is reached, the control automatically cuts off the power, the motor reverses and the operator may then withdraw the expander and go on to the next tube end.

Check No. 13 on Reply Card for more Details

Threading, Trimming Unit

In addition to threading and trimming, the No. 302 threading and trimming machine, made by V & O Press Co. division of Rockwell Mfg. Co., Hudson, N. Y., may be utilized for beading, knurling and curling, either as separate operations or in combination, depending upon the nature of the work. A typical part is placed



in a chute by the operator, then fed automatically into the chuck, threaded and automatically ejected at the rate of 35 per minute. By an interchange of chucks, covers may be handled with the same sequence of operations.

Machine stands 4½ feet high, measures 5½ feet from front to back and is 6½ feet wide. It is powered by a 2 hp, 900 rpm motor using a V-belt drive, and is equipped with automatic lubrication.

Check No. 14 on Reply Card for more Details

Welder Gun Balancer

Welding gun may be balanced in any position without up or down creep with the portable welder gun balancer and hanger offered by Platz Co. Inc., 20433 Sherwood Ave., Detroit 34, Mich. Operator is free to spot weld any operation, whether in an up or down, right or left movement or stationary. Unit is complete with trolley and operates on a 4 inch

standard I-beam or may be furnished to operate on a Cleveland Tramrail or American Monorail. The complete hanger revolves 360 degrees, has adjustable welding gun extension or support arm allowing gun adjustment of 21 to 60 inches from transformer.

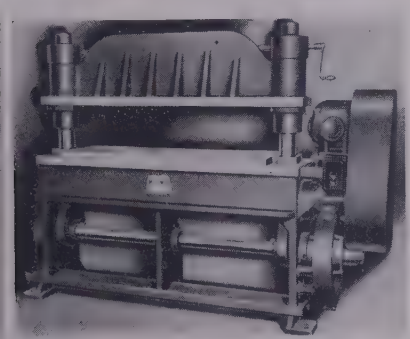
Welder gun balancing range is 52 inches, and the unit is made in sizes to balance from 10 to 150 pounds.

Operation is on 100 pound air line pressure and all balancers are built for specific weight plus or minus 2½ to 10 pounds. The transformer hanger arm is built in various lengths, from a minimum of 25½ to a maximum of 44½ inches.

Check No. 15 on Reply Card for more Details

Punch Press

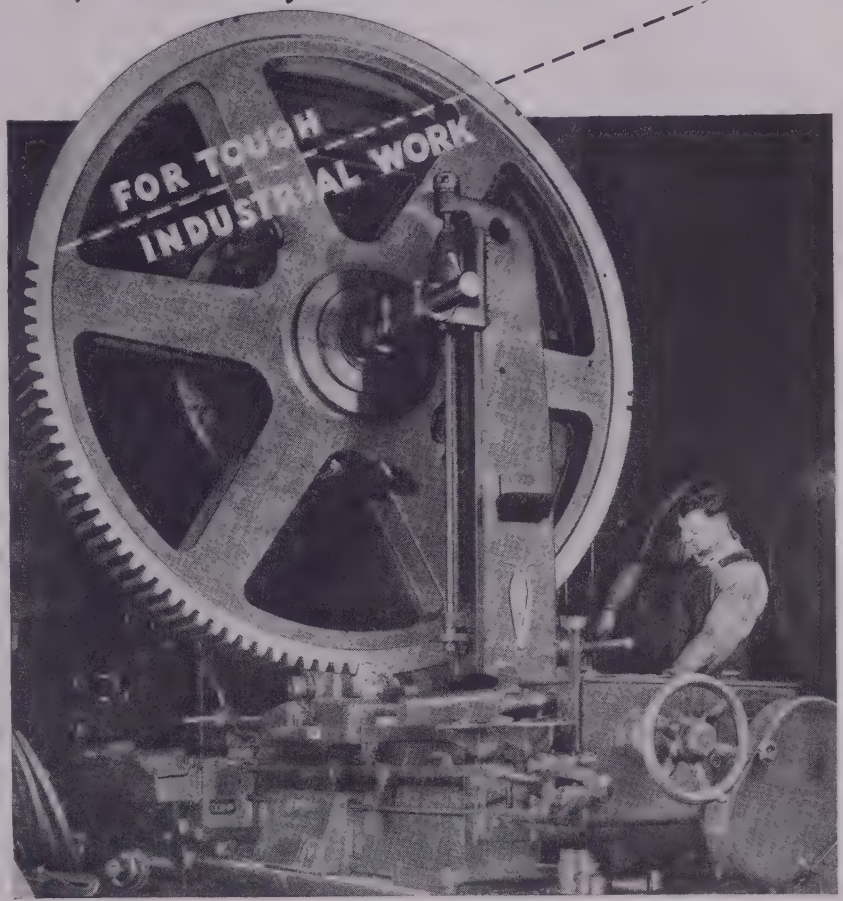
Rated at 30 tons capacity, the model 3048 Multi-Max punch press, made by Diamond Machine Tool Co., Los Angeles, 23, Calif., combines a larger bolster area of 16 x 48 inches and a ram area of 10 x 48½ inches.



These dimensions make possible a wide variety of metal stamping operations including blanking, piercing, notching, bending, shearing and drawing. Press may also be used for such diversified applications as cutting felt and fiber material with the use of steel rule dies.

Large bolster and ram areas are possible because of the compact design with the underneath double crank drive mechanism. Press is of all steel and welded construction with

SPUR GEARS
by Horsburgh & Scott



• This large gear, in the making, will soon be doing hard work in a steel mill . . . just one of many gears made by Horsburgh & Scott in sizes up to 12 feet in diameter and 20,000 pounds weight. There's a Horsburgh & Scott gear for every job . . . accurate . . . rugged . . . built to endure . . . a trial will prove their quality.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVENUE • CLEVELAND 14, OHIO, U. S. A.

a 4-point engaging clutch. Standard stroke is 2 inches and maximum stroke to order is 4 inches. Speed is 80 strokes per minute and standard shut die height is 10 inches with a maximum to order practically unlimited.

Check No. 16 on Reply Card for more Details

• • •

COATING: Protect-O-Metal No. 8, made by G. W. Smith & Sons Inc., Dayton 3, O., is a new coating to protect parts and raw stock from rusting prior to welding and between operations. Applied with brush, spray or by dipping, it dries in less than an hour to a thin, transparent coating.

Check No. 17 on Reply Card for more Details

ANALYZER: Model SB7 ultrasonic analyzer, introduced by Panoramic Radio Products Inc., Mt. Vernon, N. Y., reduces the analysis of ultrasonics to the simplest and most direct procedures by enabling observation of frequency and amplitude of one or many ultrasonic signals at one time. Indications are obtainable for signals between 2 and 300 kc in the form of vertical deflections distributed across a cathode ray tube screen.

Check No. 18 on Reply Card for more Details

AIR GUNS: Paasche Airbrush Co., Chicago, Ill., offers a new line of air guns featuring a handle styled so that operator can hold it easier, a suspension hook by which gun may be hung up after each operation and a positive air shut off. A special line of interchangeable nozzles was developed for these guns.

Check No. 19 on Reply Card for more Details

BROACH: Kase Machine Co., Cleveland 19, O., adds the Jumbo series to its standard line of Glenny broaches to facilitate accurate keyway cutting in large diameter bores. These broaches are available in 1 9/16, 1¾, 1⅞, 1 15/16, 2 and 2½-inch diameter sizes.

Check No. 20 on Reply Card for more Details

WIRE: Magic Wire, announced by Midwest Automatic Control Co., Des Moines, Iowa, is a new kind of wire for electric controls, using numbers instead of color coding. Each wire has its code number imprinted in bright red on every inch of the yellow installation. Numerals do not wash or wear off, nor become discolored with age.

Check No. 21 on Reply Card for more Details

SPEED DRIVE: Infinite speed ranges, down to and including zero speed, with constant torque, under fully automatic control, is possible with the new electrical differential speed drive offered by Speed Control Inc., Wickliffe, O. Designated as Specon ED, the unit consists of a standard alternating current squirrel cage motor of any desired voltage and frequency (or any prime mover of constant rpm), two direct current motors and a differential gear box.

Check No. 22 on Reply Card for more Details

STACKING BOX: Designed for handling and storing medium loads, a new stacking box is announced by Bay Inc., Philadelphia, Pa. It is available in sizes 10 x 16 x 6 inches to 10 x 20 x 8 inches and is supplied in 16 and 18 gage steel. The continuous stacking rim assures maximum rigidity when stacked.

Check No. 23 on Reply Card for more Details

MICROSCOPES: Features of the AO Spencer microscopes offered by American Optical Co., Buffalo, N. Y., include an aluminum stand, tension adjustment that makes it possible to set coarse focusing and substage controls for as easy or stiff operation as desired, a pinch grip mechanical stage that permits rapid insertion of slides without disturbing mechanical adjustments.

Check No. 24 on Reply Card for more Details

FLUXES: Superior Flux Co., Cleveland, O., introduces two new fluxes. No. 66 silver solder paste flux has a low melting point, 650° F and liquification is constant to 1650° F. No. 77 soft solder paste flux for use in soldering steel, silver, copper, brass, various alloys and electroplated parts, will not leave any acid or gummy residue or create noxious fumes.

Check No. 25 on Reply Card for more Details

MARKER: For stamping outer circumferences of pipe, tubing, axles, large shafts and other rounded products, M. E. Cunningham Co., Pittsburgh, Pa., offers the Periphery marker. Holder is fitted with company's floating springs for retaining stamps and the channel beading around stamp slots prevents off-angle hammer blows.

Check No. 26 on Reply Card for more Details

VALVES: Two new valves for air and hydraulic use are introduced by Pneu-Trol Devices Inc., Chicago 18, Ill. Both the vernier type needle valve and floating ball check combine extreme sensitivity with rugged construction. They are made of hexagon bar stock in brass for pressures to 1000 psi and steel for 5000 psi and are available in ⅛ and ¾-inch pipe sizes, fuel thread.

Check No. 27 on Reply Card for more Details

BRAKE: The new 24-inch box and pan brake, offered by Berkroy Products Inc., Burbank, Calif., bends sheet steel up to 16 gage and up to 24-inches wide, to almost any angle, with hairline precision. It handles many types of industrial metal forming, production operations, experimental shop work, heavy equipment and folds boxes and makes a variety of complicated folds and reverse bends.

Check No. 28 on Reply Card for more Details

PNEUMATIC VIBRATOR: Type UH pneumatic vibrator that can be quickly attached to and removed from units that require vibration, such as concrete forms, mold boxes, hoppers and other applications where vibrator installation cannot be permanent, is announced by Cleveland Vibrator Co., Cleveland 13, O. Unit is obtainable in a 2-inch piston diameter size and operates on 50 to 100 psi continuous line pressure.

Check No. 29 on Reply Card for more Details

HUMIDIFIERS: Model 30 humidifier, announced by Walton Laboratories, Irvington, N. J., evaporates approximately 3 gallons of water per hour. Electrical consumption is about 230 w. Unit may be used in multiple to provide uniform, controlled humidity conditions in an enclosure or for spot humidification or for boosting humidity obtainable from existing systems of any type.

Check No. 30 on Reply Card for more Details

SPEED DRIVE: Westinghouse Electric Corp., Pittsburgh 30, Pa., announces Mot-O-Trol packaged adjustable speed drive, employing electronic precision to provide a wide, stepless range of speed control for direct current motors from alternating current sources. It starts motors, brings them up to a preset speed smoothly and rapidly, permits change of speed at any time, applies dynamic braking for stopping and reverses motors.

Check No. 31 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

METALWORKING companies are not letting uncertainty as to ultimate settlement of the steel labor controversy interfere seriously with preparations for a substantial business level in the fourth quarter. Consumers apparently believe the chances they will need steel are sufficiently good to warrant getting on order books and be in position to take tonnage or cancel or defer it in accordance with requirements.

Steel ordering, as a result, is holding up well, with bookings on some products practically full for the rest of the year. This situation is influencing sellers to be selective in acceptance of orders and making it advisable in some instances to continue some products on an allotment basis.

DEMAND— Most difficult steel product to procure today is galvanized sheets. Because of a cost-profit factor, insufficiency of steel sheets, and relatively small capacity for galvanizing, this product had been in tight supply all year. The stringency was accentuated by the government's current grain bin construction program. As a result there is some prospect that galvanizing facilities included with recently sold handmills may be put back into operation. Two other products rank close to galvanized sheets in supply stringency. They are cold-rolled carbon sheets and merchant and line pipe. Principal factors in sustaining demand for cold-rolled sheets are orders from the booming automobile industry and the refrigerator and washing machine producers, the latter two groups having experienced a business upturn. Hot-rolled sheets are in active demand but less so than cold-rolled. Plate demand is strengthening somewhat because of needs for light fuel oil tanks and water tanks, but lag in structural shape business continues. Demand for hot-rolled carbon bars is sustained at a somewhat higher level, largely because of needs of the automobile industry and forgers. Cold-finished carbon bars continue in easy supply. Demand for reinforcing bars is kept active by the high level of activity in the construction industry.

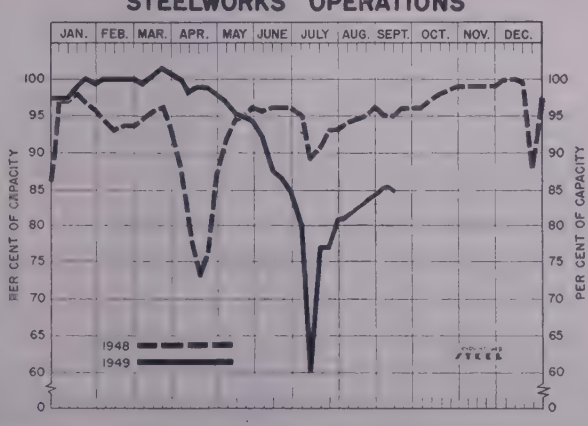
PRODUCTION—Declining for the first time since the week ended July 2, steel ingot production last week was at 85 per cent of capacity, compared with 86 per cent in the preceding week. The decline is attributable partly to the Labor Day holiday and partly to completion of some orders for delivery before a threatened steelworkers' strike. With a surge of pre-strike orders filled, one company closed part of its alloy steel producing facilities where production had been stepped up temporarily.

PRICES—Firmness characterizes prices as producers await settlement of the steel labor controversy and its ultimate effect on costs. Of minor import was a change last week in one producer's prices of uncoated ingot iron so this product will be 60 cents per 100 lb above the comparable form of ordinary carbon steel. The adjustment resulted in one decrease and a few increases. Steel price stability kept STEEL's composite on finished steel at $91.55 last week, compared with $95.05 a year ago; semifinished steel at $63.22, compared with $75.75 a year ago; and steelmaking pig iron at $45.60, compared with $44.38 a year ago.

SCRAP— Offering price of scrap continued to rise despite very light mill buying. As a result, STEEL's scrap price composite advanced last week $1.59 to $25.17 per ton, compared with $43.33 a year ago and the postwar low of $19.17 in the week ended July 23. While awaiting outcome of the steel labor controversy, mills are not inclined to buy. Furthermore they still are well stocked with scrap. Upturn in foundry business has strengthened demand for cast grades.

PIG IRON—With foundry operations and scrap prices up, demand for merchant pig iron has risen and there are prospects that some additional stacks may be put back in blast.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Sept. 10	Change	Same Week 1948	Same Week 1947
Pittsburgh	78.5	— 2*	93.5	52
Chicago	91.5	+ 0.5	94.5	93.5
Eastern Pa.	81	+ 1	92	92
Youngstown	94	None	103	92
Wheeling	92	— 4	90.5	93.5
Cleveland	99	— 2.5*	89.5	91
Buffalo	98½	— 3	106.5	88.5
Birmingham	100	None	100	99
New England	77	None	80	80
Cincinnati	95	— 2	102	94
St. Louis	87	None	91.5	82
Detroit	92	—11	100	91
Western	82	— 3	..	..
Estimated national rate	85	— 1	95	83

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *From revised rate.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Sept. 10	Sept. 3	Month Ago Aug. 1949	Year Ago Sept. 1948	5 Years Ago Sept. 1944
Finished Steel	$91.55	$91.55	$91.62	$95.05	$56.73
Semifinished Steel	63.22	63.22	62.67	75.75	36.00
Steelmaking Pig Iron	45.60	45.60	45.60	44.62	23.00
Steelmaking Scrap	25.17	23.58	20.86	43.33	18.00

FINISHED STEEL WEIGHTED COMPOSITE†

June 1949	4.01731c
May 1949	4.01731c
Apr. 1949	4.02031c
June 1948	3.57740c
June 1944	2.46683c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. June, 1949, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Sept. 10, 1949	Aug., 1949	June, 1949	Sept., 1948
Steel bars, Pittsburgh mills	3.35c	3.35c	3.35c	3.45c
Steel bars, del. Philadelphia	3.83	3.8164	3.8164	3.79
Steel bars, Chicago mills	3.35	3.35	3.35	3.35
Shapes, Pittsburgh mills	3.25	3.25	3.25	3.275
Shapes, Chicago mills	3.25	3.25	3.25	3.25
Shapes, del. Philadelphia	3.50	3.4918	3.4918	3.48
Plates, Pittsburgh mills	3.40	3.40	3.40	3.50
Plates, Chicago mills	3.40	3.40	3.40	3.40
Plates, del. Philadelphia	3.59	3.5848	3.5848	3.71
Sheets, hot-rolled, Pittsburgh mills	3.25	3.25	3.25	3.275
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	4.00
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	4.40
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	3.25
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	4.00
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	4.40
Strip, hot-rolled, Pittsburgh mills	3.25	3.25	3.25	3.275
Strip, cold-rolled, Pittsburgh mills	4.00	4.00	4.375	4.375
Bright basic, wire, Pittsburgh	4.15	4.15	4.15	4.325
Wire nails, Pittsburgh mills	5.15	5.15	5.15	5.775
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.80

Semifinished

Sheet bars, mill	$60.00	$59.25	$67.00*	$67.00*
Slabs, Chicago	52.00	52.00	52.00	52.00
Rerolling billets, Pittsburgh	52.00	52.00	52.00	59.00
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.40c	3.40c	3.40c	3.775c

† 1.50 lb coating.
* Nominal.

Pig Iron

	Sept. 10, 1949	Aug., 1949	June, 1949	Sept., 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.19	$48.08	$48.08	$48.08
Basic, Valley	46.00	46.00	46.00	43.00
Basic eastern, del. Philadelphia	49.44	49.39	49.39	47.77
No. 2 fdry., del. Pgh. (N.&S. sides)	47.69	47.58	47.58	47.58
No. 2 fdry., del. Philadelphia	49.94	49.89	49.89	48.27
No. 2 foundry, Chicago	46.50	46.50	46.25	43.25
No. 2 foundry, Valley	46.50	46.50	46.50	43.50
Southern No. 2 Birmingham	39.38	39.38	39.38	43.38
Southern No. 2 del. Cincinnati	45.43	45.43	45.43	49.09
Malleable, Valley	46.50	46.50	46.50	43.50
Malleable, Chicago	46.50	46.50	46.50	43.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	62.00
Ferromanganese, f.o.b. Etna, Pa.	175.00	175.00	175.00	148.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$27.00	$22.13	$22.60	$42.75
Heavy melt. steel, No. 2, E. Pa.	22.50	17.69	17.75	41.50
Heavy melt. steel, No. 1, Chicago	24.50	21.50	20.70	41.75
Heavy melt. steel, No. 1, Valley	26.50	21.88	21.30	42.75
Heavy melt. steel, No. 1, Cleveland	23.00	17.88	17.80	42.25
Heavy melt. steel, No. 1, Buffalo	26.25	23.38	20.35	48.15
Rails for rerolling, Chicago	38.50	32.81	27.75	64.50
No. 1 cast, Chicago	40.50	36.50	27.50	71.10

Coke

Connellsville, beehive furnace	$13.25	$13.25	$13.70	$14.50
Connellsville, beehive foundry	15.75	15.75	16.15	17.00
Chicago, oven foundry, ovens	20.00	20.00	20.24	20.40

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, nominal. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except: $57, Conshohocken, Pa.; $71, Fontana, Calif.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $63, Conshohocken, Pa.; $80, Fontana, Calif.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $65 Conshohocken, Pa.; $82, Fontana, Calif.

Sheet Bars: $60 per gross ton, Mansfield, O.; $52 on open market.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill.

Wire Rods: Basic and acid open-hearth, 7/32 & 3/8-inch, inclusive, 3.40c per lb, mill, except: 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.20c, Los Angeles, Torrance, Calif. Basic open hearth and bessemer, 7/32 to 47/64-in., inclusive, 3.50c, Sparrows Point, Md.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.50c Atlanta; 3.55c, Ecorse, Mich.; 3.75c, Houston; 3.95c, Kansas City; 4.00c, Fontana, Calif.; 4.05c, Pittsburg, Torrance, Los Angeles, Niles, Calif.; 4.10c, S. San Francisco, Calif.; Portland, Oreg., Seattle; 4.25c, Minnequa, Colo.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., Moline, Ill., Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.25c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.48c, Camden, N. J.; 5.40c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.50c, Atlanta; 4.00c, Fontana, Calif.; 3.75c, Houston; 3.95c, Kansas City; 4.05c, Los Angeles, Pittsburg, Torrance, Calif. 4.10c, Seattle, S. San Francisco, 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 3.85c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18-gage and heavier): 3.25c, mill, except: 3.45c, Ecorse, Mich.; 3.65c, Houston; 3.35c, Conshohocken, Pa., Kokomo, Ind.; 3.95c, Pittsburg, Torrance, Calif.; 4.15c, Fontana, Calif.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 5.00c, Dover, O.; 5.05c, Torrance, Calif.; 4.25c, Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.90c, Fontana, Calif.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill except: 4.50c, Kokomo, Ind.; 5.15c, Pittsburg, Torrance, Calif.; 5.40c, Dover, O.

Galvannealed Sheets: 4.95c, mill, except: 5.15c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill., Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c mill, except: 4.60c Granite City, Ill.; 4.70c, Ecorse, Mich.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill.

Electrical: Hot-rolled, 5.95c, mill, except: 6.15c, Granite City, Ill.

Motor: 6.70c mill, except: 6.90c, Granite City, Ill.

Dynamo: 7.50, mill, except: 7.70c, Granite City, Ill.

Transformer 72, 8.05c, mill; 65, 8.60c, mill; 58, 9.30c, mill; 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.40c, Atlanta; 3.45c, Detroit, Ecorse, Mich.; 3.65c, Houston; 3.85c, Kansas City, Mo.; 4.00c, Los Angeles, S. San Francisco, Pittsburg, Torrance, Calif.; 4.25c, Seattle; 4.30c, Minnequa, Colo.; 4.40c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

Cold-Rolled Strip: (0.25 carbon and less): 4.00c, mill, except: 4.15c, Riverdale, Ill.; 4.20c, Ecorse, Mich.; 4.20-4.25c, Detroit; 4.50c, New Haven and Wallingford, Conn., Boston; 4.50-5.00c, Trenton, N. J.; 4.90c, Fontana, Calif.; 5.00c, Los Angeles; 6.10c, Berea, O. One company quotes 4.00c, Pittsburgh base; another, 4.50c, Cleveland or Pittsburgh base, and 4.50c, Worcester, Mass., base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Chicago; 4.30c, Worcester, Mass.; 4.50c, Boston, Youngstown, Wallingford, Conn.

Over 0.40 to 0.60 C, 5.50c, mill except: 5.65c, Chicago; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston.

Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton and Harrison, N. J.

Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J.

Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass., Harrison, N. J.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

Tin, Terne, Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb. 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $17.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.50c, Coatesville, Pa., Claymont, Del., Conshohocken, Pa., Harrisburg, Pa.; 3.65c, Ecorse, Mich.; 3.80c, Houston; 4.00c, Fontana, Calif.; 4.30c, Seattle, Minnequa, Colo.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 4.50c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.40c, Ecorse, Mich.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.65c, Houston; 3.80c, S. San Francisco, Fontana, Calif.; 3.85c, Kansas City, Mo., Los Angeles, Torrance, Calif.; 3.90c, Seattle; 3.75c, Minnequa, Colo.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Palmer, Mass.; 4.50c, Minnequa, Colo., Atlanta; 4.75c, Kansas City, Mo.; 5.10c, Pittsburg, Calif.; 5.10c, S. San Francisco. One producer quotes 4.15c, Chicago base; another 4.30c, Crawfordsville, Ind., freight equalized with Pittsburgh, Birmingham, Chicago, Houston.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Los Angeles, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md.; 5.50c Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Los Angeles, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill except: 4.90c, Sparrows Point, Md., Kokomo, Ind.; 4.95c, Atlanta; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.75c, S. San Francisco, Los Angeles, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 4.95c, Crawfordsville, Ind., freight equalized with Pittsburgh, Birmingham, Chicago and Houston.

Galvanized (6 to 8 Gage base): 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind.; 5.40c, Atlanta; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.40c, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago, Houston.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Atlanta; 109, Worcester, Mass.; 110, Minnequa, Colo., Cleveland; 122, Pittsburg, Calif.; 123, Torrance, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 106, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago, Houston.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Kokomo, Ind., Atlanta; 116, Minnequa, Colo.; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 112, Crawfordsville, Ind., freight equalized with Pittsburgh, Birmingham, Chicago, Houston.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 143 S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base; another, Col. 126, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago, Houston.

Fence Posts (with clamps): Col. 112, Duluth, Joliet, Ill.; Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $120 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 107, Atlanta; 108, Sparrows Point, Md., Kokomo, Ind.; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 109, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago and Houston.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301.....	28.50	30.50	37.50
302.....	28.50	33.00	37.50
303.....	31.00	36.50	39.50
304.....	30.00	35.00	39.50
316.....	46.00	55.00	53.00
321.....	34.00	44.50	45.50
347.....	38.50	48.50	50.00

STRAIGHT CHROMIUM STEELS

410.....	23.00	27.00	33.00
416.....	23.50	33.50	33.50
420.....	28.50	43.50	40.50
430.....	23.50	27.50	35.50
442.....	27.00	39.00	39.50
446.....	32.50	60.00	50.00

STAINLESS-CLAD STEELS

	Plates —Cladding—		Sheets —Cladding—	
	10%	20%	10%	20%
302.....	....	....	19.75	21.50
304.....	22.50	26.50	20.75	22.50
310.....	32.50	36.50	....	....
316.....	27.00	31.00	26.00	28.00
321.....	23.50	27.50	....	....
347.....	25.00	29.00	24.00	26.00
405.....	18.75	24.75	....	....
410.....	18.25	24.25	....	....
430.....	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
7/16 and ⅝ x 6 in. and shorter.....	37 off
¾-in. and larger x 6-in. and shorter..	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter.....	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	41 off	.....
½-in. and smaller	.....	38 off
½-in.-1-in.	39 off	.....
⅝-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger.....	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright).....	46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter.....	40 off

Square Head Set Screws

Upset 1-in. and smaller.....	51 off
⅜, ⅞, & 1 x 6-in. and shorter.....	35 off
Headless, ¼-in. and larger.....	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger.....	6.75c
7/16-in. and under.....	48 off

Washers, Wrought

F.o.b. shipping point, to jobbers..Net to $1 off

Tubular Goods

Standard Steel Pipe: Eastern mill carlot prices, threaded and coupled, to consumers about $200 a net ton. Discounts from base:

Butt Weld

In.	Blk.	Gal.	In.	Blk.	Gal.
⅛.....	39½–	11–	1.....	46½–	30½–
	41½	13½		48½	33½
¼.....	37½–	13–	1¼....	47–	31–
	39½	15½		49	34
⅜.....	34–	9½–	1½....	47½–	31½–
	36	12½		49½	34½
½.....	41–	23½–	2.....	48–	32–
	43	26½		50	35
¾.....	44–	27½–	2½, 3..	48½–	32½–
	46	30½		50½	35½
			3½ & 4.	44½	29

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2....	40½	25	38½	23	28–	12½–
					38½	23
2½..	44½	29	41½	26	33½–	18–
					41½	26
3....	44½	29	41½	26	36–	20½
					41½	26
3½&4	42½–	26–	43½	28	38½–	23–
	46½	31			43½	28
5 & 6.	42½–	26–	43½	28	43½	28
	44½	29				
7....	....	....	....	....	43½	27

Pipe Cast Iron: Class B, 6-in. and over, $82.50-$93.50 per net ton, Birmingham; $87.50, Burlington, N. J.; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

For prices on line and standard wrought iron pipe and boiler tubes, please refer to Aug. 8 issue, page 111.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $3.55 per 100 lb, Williamsport, Pa., Huntington, W. Va.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace....	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.63	51.13	51.63	52.13
Brooklyn, N. Y., del.	....	52.79	53.29	....
Birmingham, furnace	38.88	39.38	....	....
Cincinnati, del.	....	45.43	....	....
Buffalo, furnace	46.00	46.50	47.00	....
Boston, del.	55.54*	56.04*	56.54*	....
Rochester, del.	47.95	48.45	48.95	....
Syracuse, del.	49.39	49.89	50.39	....
§Chicago, district furnaces..	46.00	46.50	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, del.	....	51.98	51.98	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.39	48.89	48.89	49.39
Duluth, furnace	....	....	46.50	....
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace.....	....	50.00	50.50	....
Geneva, Utah, furnace.....	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
Los Angeles, San Francisco	53.70	54.20	....	....
Granite City,*Ill., furnace...	47.90	48.40	48.90	....
St. Louis, del.	48.65*	49.15*	49.65*	....
Ironton, Utah, furnace.....	46.00	46.50	....	....
Lone Star, Tex., furnace....	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Lorain, O., furnace	46.00	....	....	47.00
Minnequa, Colo., furnace....	47.00	47.50	47.50	....
‡Neville Island, Pa., furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.19	47.69	47.69	48.19
Pittsburgh (Carnegie), furnaces	46.00	....	46.50	47.00
Sharpsville, Pa., furnace....	46.00	46.50	46.50	47.00
Steelton, Pa., furnace.....	48.00	48.50	49.00	49.50
Steubenville, O., furnace....	46.00	....	....	47.00
Struthers, O., furnace.....	46.00	....	....	....
Swedeland, Pa., furnace....	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O., furnace.....	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N. Y., furnace.....	48.00	48.50	49.00	....
Youngstown, O., furnace....	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.26	50.76	50.76	51.26

* Including 3 per cent federal transportation tax.
† Low phosphorus southern grade.
‡ To Neville Island base add: $0.95 for McKees Rocks, Pa.; $1.44 Lawrenceville, Homestead, McKeesport, Monaca; $1.90 Verona; $2.13 Brackenridge; $1.19 for Ambridge and Aliquippa.
§ Includes Chicago, S. Chicago, Ill., Gary, Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)..$59.50

6.51-7.00..	60.50	9.01- 9.50.	65.50
7.01-7.50..	61.50	9.51-10.00.	66.50
7.51-8.00..	62.50	10.01-10.50.	67.50
8.01-8.50..	63.50	10.51-11.00.	68.50
8.51-9.00..	64.50	11.01-11.50.	69.50

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $71.50 furnace, Niagara Falls; $77 open-hearth and foundry grades, Keokuk, Iowa, or Wenatchee, Wash., freight allowed to normal trade area; 12½ lb piglets, $82, Keokuk, Iowa, freight allowed to normal trade area. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.045% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn.....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $57.09 del. Intermediate phosphorus, Central Furnaces, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Diam.	Length	Cents per lb, f.o.b. plant
	Graphite	
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
6	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
	Carbon	
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace..	$13.00-13.50
Connellsville, foundry..	15.50-16.00
New River, foundry...	18.00
Wise county, foundry..	15.35
Wise county, furnace..	14.60

Oven Foundry Coke

Kearney, N. J., ovens.	$22.00
Everett, Mass., ovens.	
New England, del.‡..	22.70
Chicago, ovens	20.00
Chicago, del.	†21.45
Detroit, del.	23.91
Terre Haute, ovens....	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens ...	19.85
Chicago, del.	23.32
Cincinnati, del.	22.77
Detroit, del.	23.75
Ironton, O., ovens.....	19.40
Cincinnati, del.	21.63
Painesville, O., ovens..	20.90
Buffalo, del.	23.02
Cleveland, del.	22.62
Erie, del.	21.04
Birmingham, ovens ...	17.70
Philadelphia, ovens ...	20.45
Swedeland, Pa., ovens.	20.40
Portsmouth, O., ovens.	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del	22.95
Flint, del.	23.00
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree.....	19.00-23.50
Industrial xylol	20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia	$45.00

Per pound, ovens (Effective June 1, 1949)

Phenol, 40 (carlots, returnable drums)	13.25
Do., less than carlots	14.00
Do., tank cars	12.50
(Effective Oct. 25, 1948)	
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.) Burned chrome brick, $66; Chemical-bonded chrome brick, $69 magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)
Domestic dead-burned, ⅜" grains Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)
Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin Gibsonburg, Woodville, O., $12.25 Thornton, McCook, Ill., $12.35 Dolly Siding, Bonne Terre, Mo. $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.6
Old range nonbessemer	7.4
Mesabi bessemer	7.3
Mesabi nonbessemer	7.2
High phosphorus	7.2

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.0

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot:	17.0
Long-term contract	15.0
Brazil iron ore, 68-69%.....	19.5

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$2

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; d basis, subject to penalties guarantees are not met.)

Indian and African	
48% 2.8:1	37.1
48% 3:1	39.(
48% no ratio	31.(
South African (Transvaal)	
44% no ratio .....$25.50-26.(	
45% no ratio ....26.(	
48% no ratio .....29.00-30.(	
50% no ratio .....29.50-30.(	
Brazilian—nominal	
44% 2.5:1 lump .....$33.(	
Rhodesian	
45% no ratio .....$27-27.(	
48% no ratio .....30.(	
48% 3:1 lump .....39.(	
Domestic (seller's nearest rail)	
48% 3:1 .....$39.(	

Molybdenum

Sulphide conc., lb, Mo., cont., Mines	$0.

WAREHOUSE STEEL PRICES

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. and Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.80	6.39	6.78	5.55	...	5.55	6.09	8.00	5.25	5.50	6.70
Phila. (c'try) ..	5.65	6.24	6.63	5.40	...	5.40	5.94	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)..	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse)	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse).	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.26‡	5.94**	6.83	5.38	6.10	5.43	5.94	...	5.43	5.63	7.03
Chicago (city) .	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee(city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse) .	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60	8.05**	7.60	6.80	7.75	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)..	6.45	7.90**	7.45	6.65	7.60	6.10	8.05	...	5.95	6.15	8.05
San Francisco..	6.15[10]	7.50[3]	8.10	6.75[10]	8.25[8]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma .	6.70‡‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.35	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed.

Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 9999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

(Please turn to Page 194)

Demand for Metals Remains Active

Substantial buying imparts firm price tone to major markets. Zinc reverts to 10-cent level, following booking of tonnages by some producers at 10.50c, East St. Louis

New York — Substantial tonnages of nonferrous metals continue to be purchased, supporting present prices at fairly steady levels. Following the booking of some zinc on the basis of 10.50c on Sept. 1 through Sept. 7, the entire market reverted to the 10-cent level on Sept. 8. The only other price change in primary metals was a ¼-cent advance in silver to the basis of 73.25c, New York, on Sept. 7.

The National Association of Purchasing Agents points out in its latest bulletin that "any interruption in the operation of the steel industry would substantially reduce the demand for prime western grade of zinc.

Aluminum — The Association also notes that delivery of aluminum in all forms is almost as good as prewar. As a result of this condition, most buyers have been working their inventories down to a point where they are again in the market. Heavy buying this fall might result in some longer deliveries, although present indications are that most orders can be filled in 60 days.

Copper—Undertone of the domestic copper market is strong at the 17.62½-cent level with a substantial volume of business being booked at that price. Although some buyers are still working off inventories, copper tubing manufacturers and wire mills are placing substantial orders, while demands from brass mills are slightly heavier. Strength in the market is also reflected in an advance in brass ingot makers' and refiners' bids for red metal scrap.

Lead — Firmness characterizes the lead market. J. J. Sharkey, Western Cartridge Co. Division of Olin Industries Inc., writing in the Purchasing Agents *Bulletin* says that while sales have continued in good volume, there are some indications that buying has become more orderly and that supplies are ample to meet demands, all of which should tend to stabilize the price at around the present level.

Opening of bids on 1000 tons of lead (two lots) by the Naval Aviation Supply Office, Philadelphia, revealed that Republic Metals Co., Brooklyn, N. Y., was low at 14.44c per pound, Norfolk, Va., and American Metal Co. was low at 14.887c, Oakland, Calif., 500 tons to be delivered to each city.

Zinc—Trading in the zinc market during the first few days of this month was confused by the existence of a dual price situation. Several sellers booked tonnages on the basis of 10.50c, East St. Louis, but when the entire market failed to move to that level and when consumers failed to support the higher level, all returned to the 10-cent level.

Tin—American users of tin have shown little concern over the British Ministry of Supply's action in halting sales to this country. This is attributed to the fact that production of tin is now in excess of consumption, leaving a substantial amount available for acquisitions by the government for stockpiling. Shipments of Straits tin in August amounted to 5293 tons compared with 4617 tons in July and 5782 tons in August, 1948. Shipments for the first eight months came to 35,920 tons compared with 31,689 tons in the like period a year ago.

Straits Tin Ban Continues

New York — British Ministry of Supply, which suspended sales of Straits tin to American dealers on Aug. 30, is expected to make the metal available again soon, according to London cables. This decision followed a conference in The Hague among tin-control officials of the Ministry of Supply, United Kingdom trade experts and representatives of Belgian and Dutch producers.

Reason for the suspension of tin sales through London was to avert a potentially large loss of dollars through New York buying of the metal with cheap forward sterling. It followed the lifting by the United States government of its wartime ban on private importation of tin.

Trade circles in London doubt whether the Ministry of Supply has adequate facilities for carrying on day-to-day business with overseas markets and they are urging reopening of the London Metal Exchange to permit resumption of dealings in tin. The United Kingdom's long term policy on tin marketing, however, is not likely to be settled until the current economic conference in Washington is concluded.

No decision is expected as to whether the Ministry of Supply will continue to handle the marketing of tin or whether private dealers will be allowed to resume their prewar function until the working party set up by the Tin Study Group reports sometime this month on its efforts to reach an international commodity agreement.

Urges Speed in Stockpiling

New York—Stockpiling of aluminum should be carried out immediately and on a large scale, in the interests of national defense, J. Louis Reynolds, vice president, Reynolds Metals Co., says.

This statement followed disclosure that Permanente Metals Corp. has arranged to furnish up to 40 per cent of future government aluminum purchases of the metal.

Mr. Reynolds declared his company's negotiations to obtain "barter rights" similar to those of Permanente, under which the Henry J. Kaiser company is paying for three former government aluminum plants through deliveries of aluminum ingot in lieu of cash, had not been concluded.

Legal stipulations under which the Permanente arrangement was carried out appeared, meanwhile, in conflict with an overriding administrative decision of the General Services Agency, which would prevent the country's third and largest aluminum company from participating in the stockpiling program.

The GSA has indicated in Washington that Peramnente and Reynolds are to share on a 40-60 per cent basis in purchases so far set for this year under rules charging it with fostering competition in the industry.

Mr. Reynolds said that it had been his understanding that Aluminum Co. of America might legally conclude a similar deal to that of Permanente, furnishing ingot instead of cash, if it so desired, in its purchase of the former government reduction plant at Massena, N. Y.

In urging a prompt and vigorous stockpiling program the Reynolds Metals executive said enough aluminum should be stockpiled to provide "two to four times the aluminum reserves the country had on hand at the close of the war." No figures are immediately available on the government's holdings at that time, although stocks were estimated at 37 million pounds near the close of 1947.

Mr. Reynolds said in support of his contention that:

1. Present government stocks are either dangerously low or non-existent.

2. Aircraft production in another war might be double that of World War II. To date, no actual estimate of aluminum needs for this purpose has been formulated.

3. Aluminum production capacity in the United States is now roughly half of what it was in World War II, with about 1300 million pounds being produced annually. Canadian production capacity augments this figure by about 800 million pounds a year.

4. Vastly increased demands upon the nation's electric-power producing capacity have narrowed the chances of the industry for obtaining low-cost power and made doubly difficult the obtaining of any additional power, should an emergency require more aluminum production capacity.

Offers Round-Edge Flat Wire

Peru, Ill.—American Nickeloid Co., this city, announces the availability of round-edge flat wire. Furnished in nickel or chrome finish on steel base.

Known for its smooth edges, narrow widths, heavy gages and rigidity, round-edge flat wire is available finished on one or both sides. It is furnished in 0.035 in. to 0.125 in. thickness, and 3/16-in. to 2 in. widths. Standard length in nickel finish is 71 in. or 142 in. cut into two parts, no one part exceeding 95 in. In chrome finish, lengths are 70 in. or 140 in. cut into two parts, no one part exceeding 94 in.

NONFERROUS METAL PRICES

(Cents per pound, cariots, except as otherwise noted)

Copper: Electrolytic 17.62½c, Conn. Valley, Lake, 17.75c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 15.00-16.50c; 88-10-2 (No. 215) 24.50c; 80-10-10 (No. 305) 21.00c; No. 1 yellow (No. 405) 13.25-14.25c.

Zinc: Prime western 10.00c, brass special 10.25c, intermediate 10.50c, East St. Louis; high grade 11.00c, delivered.

Lead: Common 14.92½c; chemical 15.02½c; corroding 15.02½c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 15.25-15.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25c; grade 2, 16.25c; grade 3, 15.25c; grade 4, 14.25c. Prices include freight at carload rate up to 75 cents per 100 lb.
5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in .5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $72-$75 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 73.00c per ounce.

Platinum: $69-$72 per ounce.

Palladium. $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 16-cent copper.)

Sheet: Copper 31.30; yellow brass 28.19; commercial bronze, 95%, 31.28; 90%, 30.84; red brass, 85%, 29.89; 80%, 29.47; best quality, 29.01; nickel silver, 18%, 41.78; phosphor-bronze, grade A, 5%, 50.47.

Rods: Copper, hot rolled 27.15; cold drawn 28.40; yellow brass free cutting, 22.76; commercial bronze, 95% 30.97; 90% 30.53; red brass 85% 29.58; 80% 29.16.

Seamless Tubing: Copper 31.34, yellow brass 31.20; commercial bronze 90% 33.50; red brass 85% 32.80; 80% 32.38.

Wire: Yellow brass 28.48; commercial bronze, 95% 31.57; 90% 31.13; red brass, 85% 30.18; 80% 29.76; best quality brass 29.30.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.42½, l.c.l. 23.05, c.l. 22.55; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.693, l.c.l. 25.443, c.l. 24.943; magnet, delivered, c.l. 27.62½, 15,000 lb or more 27.87½, l.c.l. 28.37½.

ALUMINUM

Sheets and Circles: 2s and 3S mill finish c.l

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12.24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $20.12½ per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $20.12½ per cwt. Traps and Bends: List price plus 55%.

ZINC

Sheets, 14.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 14.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 13.00c; over 12-in., 14.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 27.96c; oval 27.46c; cast 25.99c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Clevland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 2090 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 40.50c, f.o.b. Cleveland; 39.25c, Detroit; 39.25c, Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 88.00c; 100 lb kegs, 89.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	14.62½	14.62½	13.87½
Yellow brass	12.00	11.75	11.00
Commercial Bronze			
95%	13.62½	13.37½	12.87½
90%	13.50	13.25	12.75
Red Brass			
85%	13.25	13.00	13.12½
80%	13.00	12.75	12.25
Best Quality (71-80%)	12.87½	12.62½	12.12½
Muntz Metal	11.12½	10.87½	10.37½
Nickel, silver, 10%	14.00	13.75	7.00
Phos. bronze, A	16.37½	16.12½	15.12½
Naval brass	11.62½	11.37½	10.87½
Manganese bronze	11.62½	11.37½	10.75

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.50; No. 2 copper 13.50; light copper 12.50; composition red brass 11.25-11.50; radiators 9.25; heavy yellow brass 8.50-8.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.50-14.75; No. 2 copper 13.50-13.75; light copper 12.50-12.75; refinery brass (60% copper) per dry copper content 12.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 12.75-13.00; No. 2 11.75-12.00; light copper 10.75-11.00; No. 1 composition red brass 9.25-9.50, No. 1 composition turnings 8.75-9.00, mixed brass turnings 5.75-6.00; new brass clippings 10.00-10.50, No. 1 brass rod turnings 7.75-8.00; light brass 5.75-6.00; heavy yellow brass 6.25-6.50; new brass rod ends 7.75-8.00; auto radiators, unsweated 7.75-8.00; cocks and faucets, 7.50-7.75; brass pipe 8.25-8.50.

Lead: Heavy 11.25-11.75, battery plates 6.50-6.75, linotype and stereotype 11.75-12.00, electrotype 10.50-11.00, mixed babbitt 11.75-12.00, solder joints, 14.50-15.00.

Zinc: Old zinc 4.00-4.50, new die cast scrap 3.50-4.00, old die cast scrap 2.50.

Tin: No. 1 pewter 52.00-54.00, block tin pipe 70.00-72.00, No. 1 babbitt 40.00-42.00.

Aluminum: Clippings 2S 10.00-10.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.00-3.50.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Aug. Avg.	17.625	14.806	10.000	103.00	17.000	38.500	40.000	71.889
July Avg.	17.279	13.335	9.346	103.000	17.000	38.500	40.000	71.500
June Avg.	16.606	11.850	9.548	103.000	17.000	38.500	40.000	71.500
Sept. 1-6	17.62½	14.92½	10.00–10.50	103.00	17.00	38.50	40.00	73.00
Sept. 7	17.62½	14.92½	10.00–10.50	103.00	17.00	38.50	40.00	73.25
Sept. 8	17.62½	14.92½	10.00	103.00	17.00	38.50	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt.	$27.00**
No. 2 Heavy Melt.	25.00**
No. 1 Busheling.....	27.00*
No. 1 Bundles.....	27.00*
No. 2 Bundles	19.50-20.50*
No. 3 Bundles	18.50-19.50*
Heavy Turnings	21.00-22.00*
Machine Shop Turnings	16.00-17.00
Mixed Borings, Turnings	16 00-17.00
Short Shovel Turnings.	19.00-20.00
Cast Iron Borings.....	18.00-19.00
Low Phos. Steel.....	27.50-28.00*

Cast Iron Grades

No. 1 Cupola Cast....	32 00-34.00
No. 1 Machinery Cast.	36.00-37.00
Charging Box Cast....	29.00-29.50
Heavy Breakable Cast.	26.50-27.00
Brake Shoes	29.50-30.50

Railroad Scrap**

No. 1 R.R. Heavy Melt	32.00-32.50
Axles	36.00-37.00
Rails, Random Length.	35.00-36.00
Rails, 2 ft and under..	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties ...	33.00-34.00
Angles, Splice Bars....	33.00-34.00

*Nominal.
**Brokers purchase prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$23.00†
No. 2 Heavy Melt. Steel	22.00†
No. 1 Busheling.....	23.00†
No. 1 Bundles.....	23.00†
No. 2 Bundles.....	20.00†
Machine Shop Turnings	15.00†
Mixed Borings, Turnings	16.50-17.00†
Short Shovel Turnings.	16.50-17.00†
Cast Iron Borings.....	16.50-17.00†
Bar Crops and Plate...	24.00-25.00†
Punchings & Plate Scrap	24.00-25.00†
Cut Structurals	25.00-26.00†

† Nominal.

Cast Iron Grades†

No. 1 Cupola	38.00-40.00
Charging Box Cast....	32.00-34.00
Stove Plate	33.00-35.00
Heavy Breakable Cast.	30.00-32.00
Unstripped Motor Blocks	28.50-30.50
Malleable	32.00-34.00
Brake Shoes	29.00-31.00
Clean Auto Cast.....	40.00-42.00
No. 1 Wheels.....	33.00-35.00
Burnt Cast	30.00-32.00

† Nominal.

Railroad Scrap

No. 1 R.R. Heavy Melt	25.00-26.00
R.R. Malleable	33.00-34.00
Rail, 3 ft and under..	37.00-38.00
Rails, Random Lengths	31.00-32.00
Cast Steel	26.00-27.00
Railroad Specialties ...	30.00-31.00
Uncut Tires	29.50-30.00
Angles, Splice Bars....	33.00-34.00

VALLEY

No. 1 Heavy Melt. Steel	$26.00-27.00
No. 2 Heavy Melt. Steel	23.50-24.50
No. 1 Bundles.....	26.00-27.00
No. 2 Bundles.....	21.50-22.50
Machine Shop Turnings	17.00-18.00
Short Shovel Turnings.	19.50-20.50
Cast Iron Borings.....	19.50-20.50
Low Phos.	27.50-28.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00

CINCINNATI

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling.....	20.00
No. 1 Bundles.....	22.00
No. 2 Bundles.....	18.00
Machine Shop Turnings	11.00
Mixed Borings, Turnings	13.00
Short Shovel Turnings.	14.00
Cast Iron Borings.....	14.00

Cast Iron Grades

No. 1 Cupola Cast....	37.50
Charging Box Cast....	29.00
Heavy Breakable Cast.	28.00
Stove Plate	28.00
Unstripped Motor Blocks	20.00
Brake Shoes	20.00
Clean Auto Cast.....	37.50
Drop Broken Cast.....	40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00
R.R. Malleable	30.00
Rails, Rerolling	33.00
Rails, Random Lengths	31.00
Rails, 18 in. and under	40.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$20.00-21.00
No. 1 Bundles.....	23.00-24.00
No. 2 Bundles.....	20.00-21.00
No. 1 Busheling.....	23.00-24.00
Machine Shop Turnings	15.00-16.00
Mixed Borings, Turnings	15.00-16.00
Short Shovel Turnings.	17.00-18.00
Cast Iron Borings.....	17.00-18.00
Punchings & Plate Scrap	23.00-24.00

Cast Iron Grades

No. 1 Cupola Cast....	32.00-33.00
Heavy Breakable Cast.	28.00-29.00
Clean Auto Cast.....	32 00-33.00

BUFFALO

No. 1 Heavy Melt. Steel	$26.00-26.50
No. 2 Heavy Melt. Steel	23.50-24.00
No. 1 Bushelings.....	24.00-24.50
No. 1 Bundles.....	25.00-25.50
No. 2 Bundles.....	21.50-22.00
Machine Shop Turnings	16.00-16.50
Mixed Borings, Turnings	18.00-18.50
Cast Iron Borings.....	18.00-18.50
Short Shovelings	18.00-18.50
Low Phos.	28.00-28.50

Cast Iron Grades

No. 1 Cupola.....	36.00-37.00
No. 1 Machinery.....	37.00-37.50
Mixed Yard	34.00-34.50
Malleable	35.50-36.00

Railroad Scrap

Rails, 3 ft. and under.	31.50-32.00
Scrap rails	28.50-29.00
Specialties	29.50-30.00
No. 1 car wheels.....	29.50-30.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	22.50
No. 1 Busheling.....	22.50
No. 1 Bundles.....	24.00
No. 2 Bundles.....	21.50
Machine Shop Turnings	15.50-16.00
Short Shovel Turnings.	17.00-18.00
Mixed Borings, Turnings	15.50-16.00
Bar Crop and Plate...	25.50
Punchings & Plate Scrap	25.50
Cut Structurals	24.50
Elec. Furnace Bundles.	24.00
Heavy Turnings	24.00
No. 1 Chemical Borings	19.50-20.00

Cast Iron Grades

No. 1 Cupola Cast....	35.00
No. 1 Machinery Cast.	37.00
Charging Box Cast....	31.00-32.00
Heavy Breakable Cast.	31.00-32.00
Unstripped Motor Blocks	30.00
Clean Auto Cast.....	37.00
No. 1 Wheels.....	34.00-35.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	16.00-17.00
No. 1 Busheling	15.00-16.00
No. 1 Bundles.....	13 00-18.50
No. 2 Bundles.....	14.00-15.00
No. 3 Bundles	nominal
Machine Shop Turnings	9.00-10.00
Mixed Borings, Turnings	9.00-10.00
Short Shovel Turnings.	10.00-11.00
Punchings & Plate Scrap	20.00-21.00
Cut Structurals	20 00-21.00
Elec. Furnace Bundles.	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast....	27.00-28.00
No. 1 Machinery.....	30.00
Charging Box Cast....	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	22.00
Malleable	27.00-28.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$14.00-14.50
No. 2 Heavy Melt. Steel	12.00-13.50
No. 1 Bundles.....	14.00-14.50
No. 1 Busheling.....	10.50-11.00
Machine Shop Turnings	6.50-7.00
Mixed Borings, Turnings	3.50-7.50
Short Shovel Turnings.	7.50-8.50
Bar Crops and Plate..	14.50-15.50
Punchings & Plate Scrap	14 50-15.50
Chemical Borings	10.50-11.00

Cast Iron Grade

No. 1 Cupola Cast.....	23.00-24.00
Mixed Cast	21.00-22.00
Heavy Breakable Cast.	16.00-17.00
Stove Plate	19.00-20.00
Unstripped Motor Blocks	17.00-18.00

CHICAGO

No. 1 Heavy Melt. Steel	$24.00-25.00
No. 2 Heavy Melt. Steel	22.00-23.00
No. 1 Bundles.....	24.00-25.00
No. 2 Bundles.....	22.00-23.00
No. 3 Bundles.....	17.00-18.00
Machine Shop Turnings	15.00-16.00
Mixed Borings, Turnings	16.00-17.00
Short Shovel Turnings.	17.00-18.00
Cast Iron Borings.....	16.00-17.00
Bar Crops and Plate..	29.00-31.00
Punchings	29.00-31.00
Elec. Furnace Bundles.	25.00-26.00
Heavy Turnings	23.00-24.00
Cut Structurals	26.00-27.00

Cast Iron Grades

No. 1 Cupola Cast....	40.00-41.00
Clean Auto Cast.....	40.00-41.00
No. 1 Wheels.....	33.00-34.00
Stove Plate	29.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00-29.00
Malleable	32.00-33.00
Rails, Rerolling	38.00-39.00
Rails, Random Lengths	34.00-35.00
Rails, 2 ft. and under	38.00-39.00
Rails, 18 in. and under	39.00-40.00
Railroad Specialties ..	30.00-31.00
Angles, Splice Bars...	33.00-34.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$24.00-25.00
No. 2 Heavy Melt. Steel	21.00-22.00
Machine Shop Turnings	16.00
Short Shovel Turnings.	16.00

Cast Iron Grades

No. 1 Cupola Cast....	35.00-36.00
Charging Box Cast....	30.00-32.00
Heavy Breakable Cast.	27.00-28.00
Brake Shoes	27.00-28.00
Clean Auto Cast.....	36 00-38.00
Burnt Cast	27.00-28.00

Railroad Scrap

R.R. Malleable	30.00-31.00
Rails, Rerolling	36.00-37.00
Rails, Random Lengths	29.00-30.00
Rails, 3 ft. and under.	32.00-33.00
Uncut Tires	24.00-25.00
Angles, Splice Bars....	32.00-33.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	18.00
No. 2 Bundles	20.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings.	17.00
Cast Iron Borings....	17.00
Bar Crops and Plate..	28.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.50
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

STEELMAKING SCRAP COMPOSITE

Sept. 10	$25.17
Sept. 3	23.58
Aug. 1949	20.86
Sept. 1948	43.33
Sept. 1944	18.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
R. R. Malleable	nominal
Rails, Rerolling	30.00
Rails 3 ft. and under.	25.00-26.00
Angles and Splice Bars	29.50

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	15.00
Nos. 1 & 2 Bundles....	13.00

Cast Iron Grades

No. 1 Cupola Cast....	23.00-25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Wheels	17.00
Rails, Random Lengths	17.00

SEATTLE

No. 1 Heavy Melt. Steel	$16.00
No. 2 Heavy Melt. Steel	16.00
No. 1 Bushelings.....	13.50
Nos. 1 & 2 Bundles...	14.00
No. 3 Bundles.....	nom.
Machine Shop Turnings	11.00
Mixed Borings, Turnings	11.00
Punchings & Plate Scrap	22.00
Cut Structural	22.00
Elec. Furnace Bundles.	23.00

Cast Iron Grades

No. 1 Cupola Cast....	20.00-22.00
Heavy Breakable Cast.	17.00
Stove Plate	17.00
Unstripped Motor Blocks	17.00
Malleable	20.00
Brake Shoes	17.00-18.00
Clean Auto Cast	23.00
No. 1 Wheels	22.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Railroad Malleable	22.00
Rails, Random Lengths	17.00
Angles and Splice Bars	17.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles...	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	26.00

Cast Iron Grades

No. 1 Cupola Cast....	28.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	25.00

HAMILTON, ONT.

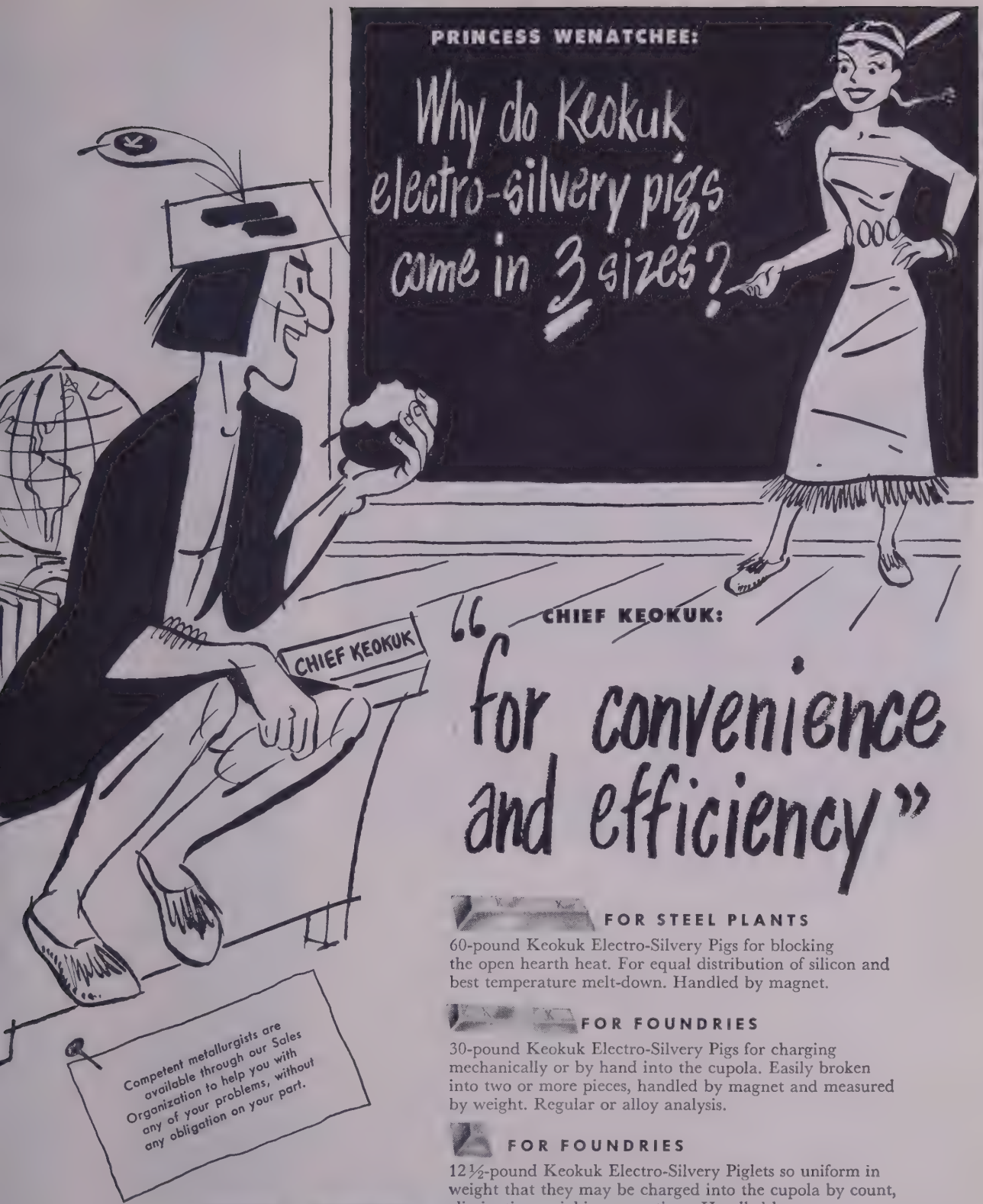
(Delivered prices)

Heavy Melt.	$20.00
No. 1 Bundles.....	20.00
Mechanical Bundles....	18.00
Mixed Steel Scrap.....	16.00
Mixed Borings, Turnings	14.00
Rails, Remelting	20.00
Rails, Rerolling	23.00
Busheling	14.00
Bushelings new factory, prep'd	18.00
Bushelings new factory, unprep'd	13.00
Short Steel Turnings...	14.00

Cast Iron Grades*

Cast	33.00-35.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.


PRINCESS WENATCHEE:
Why do Keokuk electro-silvery piggs come in 3 sizes?
CHIEF KEOKUK
Competent metallurgists are available through our Sales Organization to help you with any of your problems, without any obligation on your part.

CHIEF KEOKUK:

"for convenience and efficiency"

FOR STEEL PLANTS

60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature melt-down. Handled by magnet.

FOR FOUNDRIES

30-pound Keokuk Electro-Silvery Pigs for charging mechanically or by hand into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

FOR FOUNDRIES

12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handled by magnet. Regular or alloy analysis.

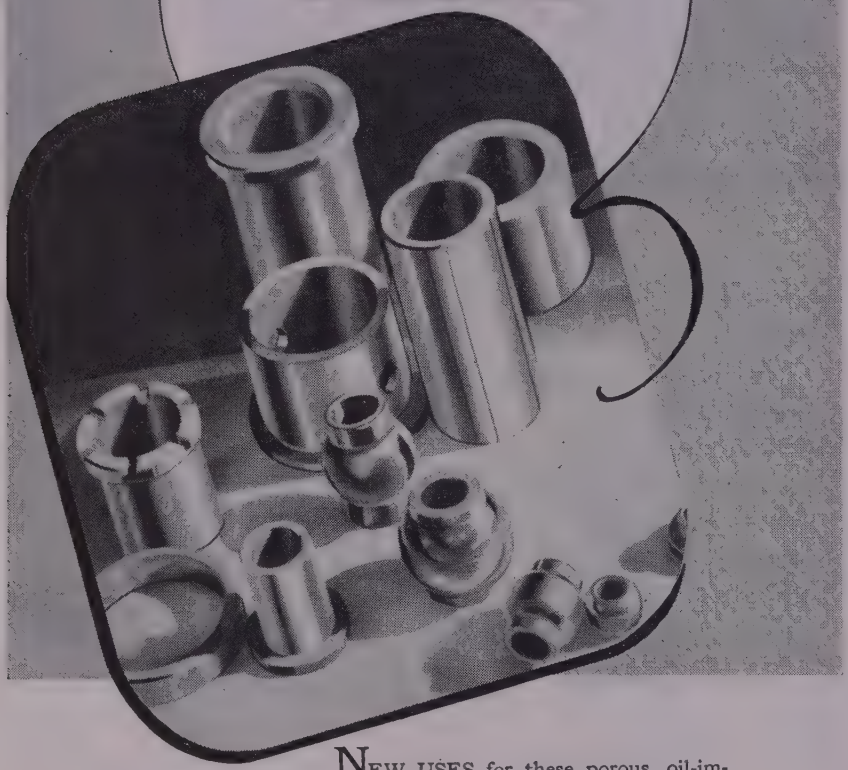
KEOKUK
electro-silvery

BY KEOKUK ELECTRO-METALS COMPANY
KEOKUK, IOWA
WENATCHEE DIVISION, WENATCHEE, WASHINGTON

SALES AGENTS: MILLER AND COMPANY, 332 S. Michigan Ave., Chicago 4, Illinois
Cincinnati 2, Ohio, 3504 Carew Tower • St. Louis 1, Mo., 407 N. Eighth St.

POSSIBLY YOU, TOO, CAN USE LOW COST

Self-
LUBRICATING
JOHNSON
Ledaloyl
BEARINGS



NEW USES for these porous, oil-impregnated bearings are being discovered every month. They answer the long-felt need in applications where it is difficult or impossible to supply adequate lubrication. They may even be sealed in place. Johnson Ledaloyl Bearings can be used, too, for their low cost in many applications where heavy duty service is not a factor. Being molded under high pressure from powdered metal, they are much lower in cost than machined bearings, particularly in odd-shaped, flanged and self-aligning designs, and in large quantities of a size. You, too, may find practical uses for them and benefit from substantial savings.

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Sheets, Strip . . .

Sheet Prices, Page 170

Some mills may restore allotment distribution of galvanized sheets

Pittsburgh—Galvanized sheets continue in tightest supply of all flat-rolled items. Some interests are scheduled into December and are seriously considering return to mill allotment distribution; there also is fair prospect galvanizing facilities included with recently sold hand mills will be pressed into service. Plain cold-rolled sheets remain in tight supply with most producers booked through October; cold-rolled strip bookings also have recorded steady improvement in recent weeks and in fact all flat-rolled steel products are in more active demand. A major portion of improved sheet and strip demand throughout August has been attributed to strike protective buying either for delivery just prior to threatened strike or for early scheduling after termination of the possible industrywide walkout. Moderate step-up in metalworking operations also has been an important factor in improved order backlogs particularly in refrigerator and other electrical appliance industries. Projected automotive assembly schedules remain unexpectedly optimistic, an important factor in the large scale protective steel buying from this important consumer group. The extended mill deliveries on cold-rolled sheets reflects this situation, also in part to unusual heavy requirements for galvanized products.

Coating extras on galvanized sheets will not be revised upward to reflect the ½-cent higher price quoted by at least one leading zinc producer. The minimum of a quoted range is used, thus leaving the zinc price basis for determining coating extras unchanged at 10.00c.

The government's corn bin program will require nearly 50,000 tons of galvanized sheet products over a 30-day period. Some mills have notified the government that they can not take on additional galvanized tonnage.

Chicago—Buyers and steel sellers last week became somewhat more pessimistic as to the chances for settlement of the steel labor dispute without a strike and requests for prompt shipment of steel products began to mount. While on sheet specialties such as electrical grades only normal lead time is required, and some orders can be squeezed into the schedule for rolling in something less than a month's time, hot-rolled sheets are not generally available until late October and beyond.

Cold-rolled bookings go into December and with one mill are for all practical purposes sold out for the year. Some producers now note a steadily declining trend in receipt of new orders from the automotive industry, this decline having begun in second quarter and accentuated in third quarter. This trend has been obscured to some extent by the hedge buying against strike which has been widely practiced by the industry. Some observers say it presages a decline in auto building

by yearend. Household appliances are becoming more and more of a bright spot in the steel ordering picture, some manufacturers now being engaged in making units for the Christmas trade. Participants in the grain bin program will continue to receive preferential treatment from local producers on galvanized sheet orders after expiration of voluntary allocations and indications are that this industry will operate at peak levels throughout the year.

Philadelphia—Some producers are booked up for the entire fourth quarter, and some others could be, but are again limiting allotments. Meanwhile, deliveries on hot sheets are becoming more extended. While some sellers are quoting five to six weeks on an average, certain others have little to offer under two months.

Heavy pressure continues, as the season advances, for coated sheets for the grain bin storage program. One district fabricator recently has been scouring the market for galvanized sheets for one bin section only, with the idea of constructing the remainder of the bins of aluminum. More than 1100 tons of galvanized are required. Another fabricator in the South, unable to get galvanized sheets, has been inquiring for plain sheets, presumably with the idea of having them coated independently.

Sheet buying for refrigerator manufacture lags in this district, with one large interest fully covered for its 1949 model and not planning to bring out its new model until around the first of the year.

New York—While hot-rolled sheets are available for shipment within four to six weeks, cold-rolled and coated sheet deliveries generally extend through the greater part of November and beyond in some instances. Some sellers of enameling stock also report extended deliveries, with late November about the best they can do. On the other hand, electrical and stainless sheets and certain other specialties can be had for nearby shipment.

Consumers are keeping a close eye on steel labor developments and are looking for some gaps to appear in present mill schedules should the controversy be settled peacefully. Some consumers have overbought on grounds of strike protection and may request deferments.

Boston — Demand for flat-rolled products is sustained with cold-finished carbon and galvanized sheets being booked for November. Bulk of buying is for relatively prompt delivery; forward buying is still slow. Increased volume of silicon sheet business is largely for motors. Indications point to a higher level of activity by most larger consumers of sheets during the fourth quarter, as reflected in terms of stronger buying.

Improvement in cold-rolled strip is spotty with competition growing among producers of high and low-carbon grades and specialties. Converters have a well balanced supply of hot-rolled steel. Deliveries are prompt with a large ratio of tonnage rerolled in this area being shipped by truck.

Cleveland — Republic Steel Corp. revised prices of uncoated ingot iron Sept. 6 so they will be 60 cents per

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100 lb over prices for the corresponding form of ordinary carbon steel. The adjustment results in a price decrease in one case and some increases in others. Cold-rolled ingot iron strip is reduced at Warren, O., from $5.00 per 100 lb to $4.60, while hot-rolled ingot iron strip there is increased from $3.50 to $3.85. Hot-rolled ingot iron sheets, 18 gage and heavier, are raised from $3.50 to $3.85 at Cleveland and Warren, and cold-rolled ingot iron sheets are advanced from $4.50 to $4.60 at those two points.

Cincinnati — Steady demand for sheets, particularly cold-rolled and galvanized, brightens the outlook for full mill schedules in the fourth quarter. Re-entry into the market of a number of customers has been noted in recent weeks. The storage bin program has created a tight supply situation in galvanized, and mills are under pressure for deliveries.

Birmingham—Most sheet items remain in relatively tight supply even though deliveries are far better than a few months ago. Production of roofing and manufacturers' sheets is at practical capacity and little stocking is noted. Start of the ginning season means considerable demand for strip in the form of cotton ties.

Dallas — Demand for flat-rolled items continues firm in this area. Cold-rolled and galvanized are strongest and fabricators, still not making commitments too far in advance, are operating on thin inventories.

Los Angeles — Demand for flat-rolled products continues to strengthen, and sheet supplies are tighter than they have been for many months. Three factors apparently are influencing the uptrend in requirements: Depleted inventories of fabricators; protective buying against the possibility of a steel strike, although this is now minor; and a definite change for the better in business sentiment. Manufacturers of hot water heaters, whose steel buying in recent months has lagged, are back in the market on a large scale. Stringency of galvanized supplies is hampering local fabricators who have received government contracts for grain bins, and are finding it difficult to obtain material.

San Francisco — Revived demand for flat-rolled products, especially cold-rolled and galvanized sheets, continues to highlight the steel market. Consumers generally are in a better inventory position than a few months ago, but they have been buying more actively, both for current and future delivery, due to steel strike threats.

Plates . . .

Plate Prices, Page 171

New York—Plate production is expanding. Most eastern mills can still make shipments within three weeks. Tank specifications are a little bit more active, especially light fuel oil storage tanks. There is a slight betterment in demand from fabricators of water tanks, who claim more public work is going ahead than in some time. Engineers are advising clients there is now little likelihood of any important reduction in steel prices and this is having a stimulating effect in some directions. Industrial tank work is showing little gain; nor is there improvement in requirements for large oil storage facilities.

One of the larger recent tank awards in this district involves 665 tons of plates for the Socony Vacuum Oil Co., fabrication to be done by the Chicago Bridge & Iron Co., Chicago.

Demand for pressure vessels is sluggish.

Bethlehem Staten Island shipyard has been awarded a municipal ferry boat requiring 900 tons of plates and 400 tons of shapes and bars.

Philadelphia — Increasing demand for light plate is bolstering district mill operations, with rolling schedules at most plants now fairly full. This betterment reflects principally seasonal demand for light fuel oil tanks and heaters. Buying for pressure vessels and heavy tanks is spotty, and the lull in railroad and shipwork continues, with little early improvement in prospect. Dollar shortages abroad still restrict export business considerably, although some tonnage is moving, including a cargo of 3000 tons which left this port recently. Mill deliveries range around three to four weeks.

Birmingham—Need for plates is widely diversified, although individual orders are smaller than they were a few months ago. Bulk of Republic's production is being used by its tube mill, requiring other mills to operate

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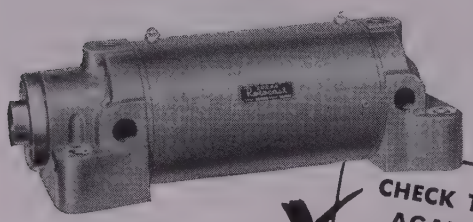

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at virtual capacity to meet other consumers' requirements.

Seattle — Plate fabricators are actively seeking new business as backlogs are small and new work is needed to continue operation at current levels.

Steel Bars . . .

Bar Prices, Page 170

Chicago—Tendency of buyers to place bar orders at the last possible minute before rolling schedules are fixed has sellers constantly uncertain as to the actual strength of demand. There has been some rush ordering preceding the strike deadline, although such activity seems less noticeable in this product and some sizes were available as late as last week for prompt mill shipment. Despite the hesitation, many sellers feel requirements are constant and some foresee rolling capacity fully booked beyond this year, although orders are not in hand. Diversity of uses is their explanation and certain of the important bar consuming groups, such as implement and construction equipment makers, predict a good business volume for some time ahead, in the former industry possibly about 75 per cent of this fiscal year's business. Cold-drawers continue to operate at a steady pace and, while much of this material is available from stock, demand is relatively constant.

New York—Hot carbon bar specifications are broadening, with practically all producers now booked into October. Machine tool builders and manufacturers of hand tools are showing a little more life and automotive requirements are well sustained. Railroad inquiry continues dull, and even some cancellations of orders are still noted. Cold-drawn carbon bars are moving slowly with consumers able to obtain almost immediate delivery from those sellers who have built up a diversified line of inventories.

Philadelphia — While demand for hot carbon bars is not as strong as for light flat products, business is at least being sustained at the somewhat higher volume of the past few weeks. Inquiry is diversified, although reflecting continued dullness in railroad specification. Mills are quoting deliveries at around four weeks on an average. Cold-drawn carbon bars can still be had for nearby shipment.

Boston—Demand for hot and cold-rolled carbon bars is light and improvement in this product lags behind that in other steel items. Buying of cold-finished bars is exceptionally slow and many distributors and consumers have large inventories. Cold finishing operations are down to a low point. Textile mill equipment builders are operating mostly on inventory, booking little new business, and this is reflected in steel buying by this substantial consuming group. Liquidation of cold-finished bar inventories is still in progress in some directions. While forge shops operating on automotive orders are active, others are slow.

Pittsburgh — Inventory retrenchment policy among consumers of cold-finished bars appears to have run its course on the basis of an upturn in ordering within the trade. Demand from jobbers remains depressed. New orders for October delivery are well sustained, notably in the merchant hot-rolled group. Automotive needs continue as the major consumer outlet, although demand from electrical appliance concerns is heavier. Little change is noted in bookings from farm implement manufacturers, although the outlook is more promising. Forge shops are slightly more active.

Output of alloy bars here returned to normal on the termination of the strike at the Midland plant of Crucible Steel Co. of America.

Dallas—Some improvement is reported in demand for bars, with supplies of hot carbons becoming difficult to obtain to meet all requirements as needed. Orders are being placed for forward periods in anticipation of even greater demand for the immediate future.

Tin Plate . . .

Tin Plate Prices, Page 171

San Francisco—West Coast food canners are taking sharply reduced amounts of tin plate this year because of cutbacks in their packs. With the possible exception of pears, all tinned fruit and vegetable output is being trimmed. Production of canned peaches will be cut at least 250,000 cases under that of last year, while a reduction of 4 million cases is in prospect for fruit cocktail.

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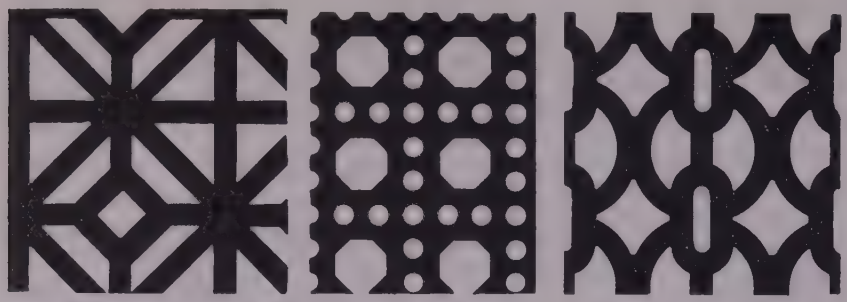

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Structural Shapes . . .

Structural Shape Prices, Page 171

Philadelphia—Considerable bridge work is accumulating for action over the next several weeks. Steel for the Chesapeake Bay bridge, Baltimore, amounting to an estimated 40,000 tons or so, may be placed shortly. Bids went in a few days ago on 2570 tons for a state bridge at Williamsport, Pa. In addition to 5340 tons for a state bridge project in Westmoreland and Allegheny counties, noted in the Aug. 15 issue as up for bids Sept. 30, several other state projects are now up for bidding on that date, including one in Allegheny county involving 3705 tons. Most of these projects also require fairly substantial tonnages of reinforcing steel as well. Bids are in on several state turnpike sections, with one section in Daulphin county, involving 530 tons, having just been placed.

Private awards include 1700 tons for an apartment here and 1100 tons for a power plant extension, Devon, Conn., placed through Philadelphia engineers.

Meanwhile, most fabricators are able to reduce backlogs to some extent and are in easy position as to stocks. Leading shops report more than normal inventories, although not a great excess. This situation is reflected in a continued lack of pressure on shape mills, which can still promise deliveries within three to four weeks on standard sections and somewhat more extended shipments on special sections.

Anticipating a formal change in ownership of the Phoenixville, Pa., shape mill and bridge shop Sept. 19, district offices of subsidiaries of the Barium Steel Co., the new owner, are actively soliciting shape tonnage in an effort to get production at the Phoenixville mill under way again as rapidly as possible, once facilities are ready to resume.

Boston — Volume of fabricated structural steel being estimated is light and is confined largely to public works, including a 1200-ton housing project in South Boston. Awards include 765 tons for a bridge in Maine to Harris Structural Steel Co., New York. Unit bids were 11.75c for fabricated steel delivered and 3.75c for erection. Five shops bid on the steel. More than a normal volume of steel grid flooring for bridges is being bought.

As a result of the latest increase in freight rates, plain material from Bethlehem, Pa., although the mill price is $1 a ton higher than at Pittsburgh, has a $3.60 per ton advantage over the latter producing point on the basis of Boston delivery.

New York—While the structural market is fairly brisk, activity is expected to ease this fall as the seasonal letup develops in road work and bridge construction. Fabricated steel prices are somewhat firmer.

Dallas—New construction contracts in Texas during the first half of 1949 were nearly $55 million ahead of the record-breaking total reached at the end of the same period last year.

During the first 26 weeks of this year over $560 million had been

authorized for new construction of all types.

While non-residential construction dominates contracts, housing continues to set a steady pace, with a heavy portion of it in the Houston area, where the postwar boom continues with little abatement. Construction of large multiple-housing units are being pushed in both Houston and Dallas. Nearly half of current awards are earmarked for such nonresidential construction as schools, hospitals, hotels, churches and theaters.

Dallas—There has been a slight letdown in demand for structurals, with most fabricators operating off current inventories, which are adequate for immediate needs. Observers believe that many projects are marking time awaiting recommendations of the fact-finding board in the steel wage controversy. Increase in demand is expected to pick up after the decision. This belief is bolstered also by increasingly heavy construction contract awards in Texas, having just set a 27-year record high.

Los Angeles—Paramount interest of fabricators and jobbers is to reduce inventories, because structural demand remains slow. Users are limiting buying to cover immediate needs. There is little indication of near term improvement, for the vast majority of construction in this district currently is reinforced concrete, requiring comparatively little structural steel, but considerable tonnages of reinforcing bars.

San Francisco—Competition in the lagging structural market is keen, demand showing no indication of improving. Private building remains slow, with most of the projects now under way being confined to public works. Many of these call for only small quantities of structurals.

Seattle — Fabricating operations are fair, but backlogs are declining. Demand for small tonnages is less insistent and plants are in keen competition seeking new business. Materials are easy, although deliveries by water from eastern mills average six weeks.

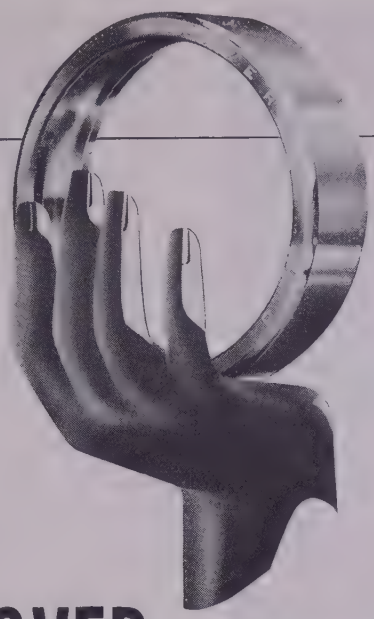
Reinforcing Bars . . .

Reinforcing Bar Prices, Page 170

Philadelphia—About 1940 tons of reinforcing steel will be required for four state bridge projects, up for bidding Sept. 30. The largest of these calls for 848 tons for Route 188, section 2, Westmoreland and Allegheny counties, Pennsylvania. Reinforcing steel requirements are in addition to a substantially larger total of structural tonnage.

Los Angeles — Reinforcing needs continue on a substantial scale, with some increase shown in recent weeks. Requirements are divided almost equally between public and private construction, the latter category having gained substantially over the level of 90 days ago. Three producers are supplying large tonnages of reinforcing bars for the huge Parklabrea housing project here, in which Metropolitan Life Insurance Co. is erecting eleven 13-story apartment buildings.

Seattle—Both local rolling mills



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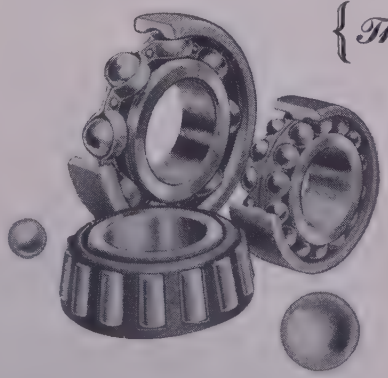

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are operating at capacity. Order backlogs for reinforcing bars are fair, but are being reduced rapidly. Less pressure from buyers is noted and mills are able to offer prompter deliveries. Demand for small tonnages, which has been outstanding for months, is tapering.

Turnover of merchant bars is slack, but producers have been able to increase their inventories.

Refractories . . .

Pittsburgh — Competitive conditions within the refractory brick industry have become more acute in recent weeks, despite moderate improvement in shipments last month compared with July. Relatively little new demand has developed for coke oven expansion or repair programs and same is true for steel mill reheating furnaces, etc. Open-hearth expansion programs at Jones & Laughlin's Pittsburgh South Works and Armco's Middletown, O., plant will bolster open-hearth brick requirements over coming months. Sellers note a relatively large volume of refractories is involved in inquiries from foreign accounts for both steel and glass industries. Producers are able to make delivery within 6 to 8 weeks on silica and super duty brick; standard shapes are available from stock.

Tubular Goods . . .

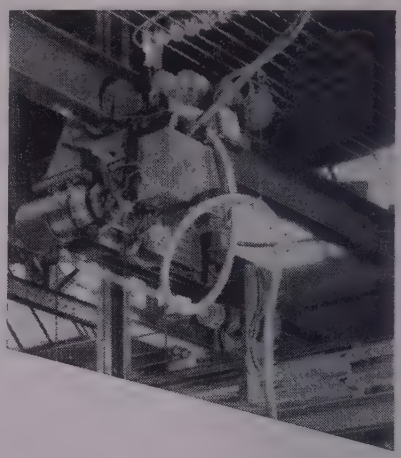
Tubular Goods Prices, Page 171

Boston—Orders for merchant steel pipe for October delivery are being placed slowly, although Sept. 15 is the deadline for next month's schedule in most instances. Utilities are not buying in volume, while galvanized pipe also is inclined to lag, large tonnage of seamless pipe will be required for laterals from prospective main lines introducing natural gas in New England. Tubing is easier with three to five weeks delivery possible on most grades of mechanical and pressure tubing. Contrary to the normal trend, demand for boiler tubes was lower last month.

Washington — Navy contracts for pipe and tubing recently placed include: Bethlehem Steel Co., welded steel pipe, $69,131.28; Tube Reducing Corp., Wallington, N. J., seamless steel tubing, $50,894.76, and Globe Steel Tubes Co., Milwaukee, boiler tubes, $51,800.20.

Los Angeles—Users' requirements for pipe and tubing continue to be substantial, although far from spectacular. Strong spots in demand are the residential construction and refrigeration industries. On the other hand, buying of pipe and equipment by the petroleum industry has tapered somewhat. Major oil companies generally are concentrating more on modernization and improvement programs, less on costly expansion of facilities.

Seattle—Business continues quiet in cast iron pipe due to heavy placements earlier by large buyers when scarcity of materials made it necessary to order far in advance. Now that producers are in position to make prompt deliveries, consignees



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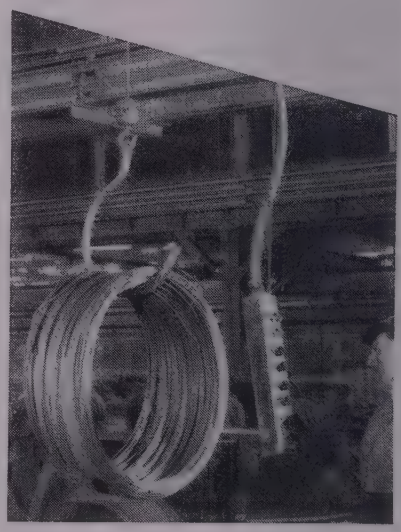

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are unable to accept because of lack of storage facilities. Seattle, Portland and other larger users of cast iron pipe accordingly have orders placed for the next year or 18 months. No important cast iron busness is up for bids. However, faster delivery has placed cast iron agencies in an improved competitive position.

Warehouse . . .

Warehouse Prices, Page 173

Pittsburgh—Improvement in warehouse steel shipments continues. The gain in shipments from stock throughout August is attributed primarily to pick-up in customers' actual needs as result of slight gain in metalworking operations with consequent necessity to balance out steel stocks which had been depleted too far in some products. Strike protective buying has developed on much larger scale than reported for August, particularly for galvanized and cold-rolled sheets. Most steel distributors have more than ample steel stocks to meet any conceivable upsurge in new orders, although it is possible warehouse may be depleted of a few selected steel items currently in very tight supply.

Chicago—Repetition of the surge in new buying in anticipation of a steel mill strike was noticed by warehouses here last week. While not constituting anything like a run on available stocks, the definite pickup seems directly traceable to the strike threat with most of the protective buying being done by larger companies which have order backlogs and are loath to be idled by materials shortages. Increased volume of business recently has not altered the supply picture to any great extent, however, only cold-rolled and galvanized sheet stocks being depleted. General consensus among warehousemen and consumers alike is that the steel strike is inevitable and there is considerable speculation as to how much "surplus" steel will again come out of inventories to be sold at premium prices if such a strike is prolonged. Some observers think the amount of hoarded material in products already in tight supply is limited and only a flurry of such offerings would occur and the supply soon would be exhausted.

Philadelphia — Higher warehouse base prices are expected to be announced shortly, reflecting at least the new freight rates which became effective Sept. 1. That these prices haven't been revised sooner is attributed to a disposition on the part of distributors to await developments in the steel wage controversy, so as to make whatever further changes might be necessary at one time. Jobbers anticipate some pick up in business this month, following the decline in August to the lowest point of the year to date. Some jobbers reported a drop last month of 10 to 15 per cent, but look for seasonal influences to bolster September trading.

Warehouse stocks are somewhat above normal, but nothing that a reasonable pick up in demand for a few weeks can't remedy. Jobbers

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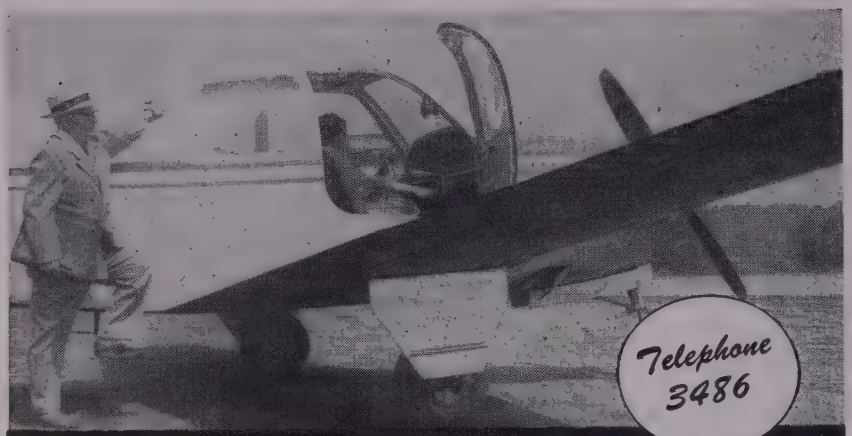

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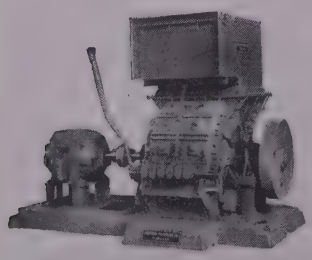

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here say little last minute buying has been engendered because of fear of a steel strike.

Cincinnati—Warehouses here so far have absorbed the recent freight rate increase, and have not issued new quotations to cover it. Sales are holding close to the August levels, most individual orders being small. Inquiries were received concerning tonnage for inventory as bulwark against a strike, but there is no indication of any considerable buying so far for this purpose.

Birmingham — Warehouse demand for steel registered another slight improvement in August. Stocks increased moderately. The supply situation is described by warehousemen as "good."

Dallas—Warehouses in this section report little change in business volume, with slight decreases in some items offset by firmness in others. The only noticeable decline in activity is reported in the structurals business. Fabricators have built up sufficient inventories for current needs. Most purchases from warehouses are in small quantities to meet immediate needs.

San Francisco—Strike of the warehousemen's union drags on, keeping about half of the warehouses here closed. Activity of jobbers remaining open has picked up somewhat in recent weeks, but overall volume is down as a result of the strike.

Los Angeles—Deliveries of jobbers continue to increase slowly, with the improvement in demand stemming from a variety of industries. Replenishing of depleted inventories by many small consumers is a major factor. Warehouse stocks are in better balance than for some time past, although galvanized, and to a lesser extent cold-rolled sheets, daily become tighter.

Seattle—There is an improved tone in the wholesale jobbing market as activity in the building industry is increasing. However, buyers are limiting purchases to their immediate needs and are not increasing inventories. Jobbers report galvanized sheets still extremely scarce, mills loaded to capacity and deliveries of current orders not likely prior to the first quarter. Jobbers' stocks are complete with the exception of this one item. Prices are steady and unchanged.

Wire . . .

Wire Prices, Page 171

Boston—Buying now covers a wider range of wire products and is in slightly larger volume for most items. Upholstery spring wire shipments are heaviest this year. Bulk of buying is of a character indicating that consumers' inventories are lower and are becoming unbalanced. New volume frequently is placed on a delivery basis and releases are appearing from users against old orders which had been deferred for some weeks. Some of this tonnage is from screw manufacturers and users of preformed stapling wire. Inventories of the latter grade were notably heavy but are gradually being reduced. Rod supplies are ample while those of semifinished are inclined to lag.

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bon spring wire continues to increase. October bookings are in good volume for bulk of wire products with the exception of barbed wire. Sellers expect a seasonal improvement soon in demand for fencing. Nails are in freer supply, although jobbers contend roofing nails are still somewhat scarce. No change is noted in requirements for bright basic wire for cold-heading and other forming operations, with demand apparently leveling off at the present depressed volume. Increase in output of refrigerators likely will result in larger requirements for refrigerator rack wire.

Birmingham — Wire output is steady and demand remains widely scattered and substantial supplies of most items are easier, including nails, but there is no general overage in any specification.

Pig Iron . . .

Pig Iron Prices, Page 172

Pittsburgh—Foundries continue to operate at a slow rate, although those serving radiation and enamelware industries have stepped up operations slightly. Producers' stocks of items used by these industries have been reduced sufficiently to warrant a higher rate of production. American Radiator & Standard Sanitary Corp. has reopened its plants at Baltimore, Bayonne, N. J., and Buffalo; its Pittsburgh plant remains closed.

Jobbing foundries note little change in outlook for continued curtailed operations; similarly foundries serving builders of railroad and coal mine cars are operating only two or three days per week. Improvement in outlook for electrical appliance production should soon be reflected in increased operations at Westinghouse and other foundries here.

New York—With weather conditions more favorable, pig iron sellers anticipate a better foundry melt this month. They look for no sharp rise, however, as foundrymen report no particular spurt in casting demand. A stronger scrap market may contribute to a greater relative consumption of pig iron, but scrap prices have not advanced sufficiently to make a particular difference to date.

Philadelphia—Pig iron sellers are more optimistic, due primarily to a livelier demand for foundry iron. District foundries, they say, are again experiencing an improvement in demand for castings and this, combined with better weather conditions and the passing of the vacation season, is resulting in a better melt.

Chicago — Improvement in merchant iron demand is general but moderate. While some foundries have stepped up operations and many captive shops are working at satisfactorily high levels, bulk of job shops continue on a reduced workweek, varying from three to four days. Local industry men put output of representative foundries at 30 per cent under capacity in second quarter, but reduction in iron demand appears to have far exceeded this figure, inventory reduction being principally to blame. Much of the recent improvement in iron demand results from buying more in line with con-

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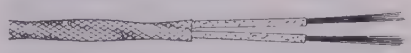

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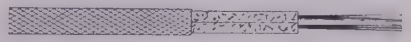

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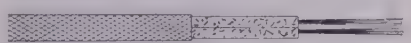

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sumption and some, of course, is for inventory as strike insurance. One iron producer here says shipments are at the highest rate since May and are eating into the company's stocks, reversing the previous situation. Bulk of cast scrap purchases which have bolstered its price in recent weeks is by captive shops, particularly those attached to the farm implement and automobile industries.

Buffalo—One of the area's leading merchant pig iron producers reports improvement in shipments for the first half of the current month. Although the gain was limited, tonnage moving was supported by active buying from automotive, agricultural and building sources. A more definite trade pattern is expected when the labor picture clears in the steel industry. Production jumped 6 points to 75 per cent of capacity when the Republic Steel Corp. relighted a stack that was shut down July 10. The furnace was placed on basic, which was believed due in part to the recent strength in the scrap market. One of the leading suppliers of coke has decided to absorb the recent freight rate boost by holding Buffalo delivered prices at former levels. American Radiator's Tonawanda plant will not resume operating its idle stack until the steel strike threat ends.

Cincinnati—More spot buying of pig iron in this district was interpreted as a sign of modest improvement in the melt. General level of foundry operations was low excepting with those interests active on automotive work. Melters contend the low point was reached in July, and that September will prove the uptrend.

Birmingham — Pig iron demand heavy, merchant melters are well booked and their shipments are the heaviest in about six months. The pickup is attributed to the scrap situation, depletion of rather large inventories, and the increase in foundry operations.

St. Louis—Pig iron makers entered September with the best backlog of firm orders since April, leading to belief the month may see return to blast of idle furnace capacity. Output the last two months has been 500 tons daily as compared to 1060 tons capacity. Better demand, on which fast shipment is usually requested, stems from a pickup in the appliances and washing machine industries. The Edwardsville, Ill., plant of American Radiator & Standard Sanitary Corp. has resumed operations.

An American Steel Foundry plant in the area shut down indefinitely a week ago.

Iron Ore . . .

Iron Ore Prices, Page 172

Cleveland — Shipments of Lake Superior iron ore from upper lake ports declined to 11,314,928 tons during August from 12,767,718 tons in July and 11,734,794 tons in August, 1948, according to the Lake Superior Iron Ore Association, this city. Cumulative total for the season to Sept. 1, amounted to 57,268,216 tons, an increase of 2,698,507 tons, or 4.95 per cent, over the total for the like 1948 period.

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Scrap . . .

Scrap Prices, Page 176

Pittsburgh—Until labor situation is clarified, major consumers are expected to remain aloof from offerings. In the interim broker covering against old orders offers most reliable basis for appraising recent upturn in market values. One such transaction involved purchase of No. 1 heavy melting at $27 and No. 2 at $25 late last week.

An indication of the scarcity of good quality local scrap is illustrated in report that one independent mill paid above $27 for No. 1 heavy melting delivered here from New York. Disproportionately high prices in other areas in relation to Pittsburgh appear to add credence to this unconfirmed report.

Recent railroad list awards have been restricted to broker purchases at substantially higher price levels. Award of No. 1 railroad heavy on Baltimore & Ohio list was made last week at $32.25 f.o.b. lines and still higher prices were reported bid on New York Central list railroad specialties, within the range of $33.25 to $34.

Philadelphia—Melting steel scrap prices have advanced sharply on light mill buying, with No. 1 now holding at $24, delivered, and No. 2 at $22.50. Other open-hearth grades also have moved to higher levels. No. 1 busheling is $22.50; No. 1 bundles, $24; No. 2 bundles, $21.50.

Mills are moving cautiously, however, still endeavoring to appraise the underlying strength of the current price movement, and most mills are in position to do so as inventories are still above normal for this season of the year. The next two weeks should shed considerable light upon the further trend of the market.

Meanwhile, cast grades have advanced sharply, with No. 1 cupola cast active at $35, delivered; No. 1 machinery, $37; charging box and heavy breakable cast, $31-$32. Unstripped motor blocks have advanced to $30; clean auto cast, $37; No. 1 wheels, $34-$35. Some of the recent buying in cast is attributed to fear of a steel strike, which would cut pig iron production.

Trading in turnings is relatively light, with prices slightly higher at $16 for machine shop turnings and mixed borings and turnings. Electric furnace bundles and heavy turnings are higher at $24.

New York—Brokers' buying prices on steel scrap are unchanged, although the market undertone continues strong and further increases have been made on cast grades. Brokers are now offering $27-$28 for No. 1 cupola, $30 for No. 1 machinery, and $25-$26 for charging box and heavy breakable cast and $22 for unstripped motor blocks.

Chicago—Confusion in scrap price levels deepened last week with brokers' buying prices outstripping last mill purchase prices on several items. Sharpest advance was on No. 1 railroad heavy melting steel, now quotable conservatively at $28-$29. Other rail items were also stronger, rerolling rails moving up to $38-$39 and specialties to $30-$31. Cast scrap is bringing somewhat

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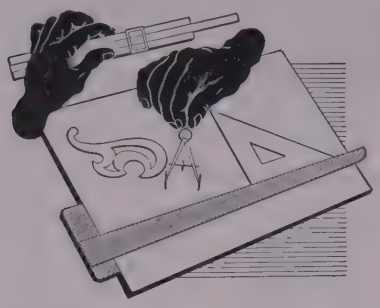

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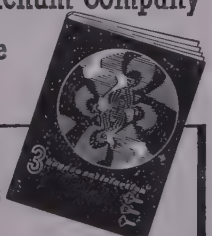

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higher prices at outlying points, but consumer purchases locally are few. Brokers, unwilling to sell short in the present market, are actively and sometimes wildly bidding with much of the strength stemming from speculative motives.

Cincinnati—Prices in the iron and steel scrap market advanced sharply without tonnage buying in the district. Scattered sales in small lots, and conditions in nearby district caused the rise. Some district mills are still out of the market. No. 2 bundles are especially dull.

Buffalo—Recent strength in steelmaking scrap grades was sustained and higher prices were posted on cast items during the week despite the steel strike threat. The trade, however, was not looking for any additional large tonnage sales until the labor question is settled. Cast grades advanced an additional $1 to $1.50 a ton as sales of mixed yard material were reported in the neighborhood of $35. Steelmaking grades held but business by local consumers with sellers in other areas bolstered the local price structure.

Detroit—While the market continues strong, a cooling-off is detected from the frantic surge of the past few weeks. It may be watchful waiting on the eve of the steel fact-finding board's report; more probably it is the leveling action always following a sharp price spurt. The local mill is not buying, but a considerable tonnage of material has been shipped out of here to both Chicago and Buffalo mills.

St. Louis—Scrap prices rose last week when the two major local steel mills re-entered the market. One bought a month's supply of No. 2 heavy melting at $22, up about $2, while the other was able to obtain only a small amount, due to reluctance of dealers to sell at that figure. With mill stocks still above 30 days, some mill buying is being done, in anticipation of further price rises. Cast grades moved up $1 to $3 under impetus of somewhat increased foundry buying and greater scarcities. Some stock rebuilding is going on, even though foundry business is slow. Railroad scrap went up $1 to $2 on offerings last week by the Wabash, Cotton and Frisco railroads.

Birmingham — Undertone of the scrap market is strong with heavy melting and comparable items at $22. Scrap dealers and brokers anticipate further moderate advances.

Los Angeles—Mills show interest in larger purchases of scrap, but there is no indication of willingness to raise prices in order to bring out the additional material. Dealers declare they are finding it difficult to provide increased tonnages at present levels. Foundry activity has improved considerably in recent weeks, principal impetus coming from public works and housing construction.

Seattle — Scrap prices are unchanged, No. 1 and No. 2 heavy melting steady at $16. Receipts are satisfactory and inventories are not being increased. Some good grade material is being shipped to the local mill from British Columbia. Demand for cast iron and electric furnace scrap is nominal and several of the larger buyers are out of the market.

Canada . . .

Toronto, Ont.—Production of primary iron and steel shapes in May amounted to 314,633 net tons which compares with 331,688 tons in April and 318,416 tons in May, 1948. May's production included 306,852 tons of carbon steel shapes and 7781 tons of alloy steel shapes.

Shipments of primary iron and steel shapes for sale in May totaled 231,921 net tons including 224,893 tons of carbon and 7028 tons of alloy steel shapes, while shipments for sale in April amounted to 248,165 tons, including 239,772 tons of carbon and 8393 tons of alloy steel shapes.

Shipments for May this year included 10,633 tons of semifinished shapes, 10,039 tons of structurals, 15,524 tons of plates, 26,275 tons of rails, 7433 tons of tie plates and track material, 55,336 tons of hot-rolled bars, 21,661 tons of pipes and tubes, 24,213 tons of wire rods, 19,520 tons of black sheets, 8882 tons of galvanized sheets, 8827 tons of castings, 4151 tons of miscellaneous hot-rolled products and 19,427 tons of all other products.

Of the shipments for sale in May, 45,044 tons went directly to railways and railway car shops; 11,009 tons to pressing, stamping and forming plants; 31,122 tons to merchant trade products; 28,355 tons to building construction; 16,880 tons to the containers industry; 9350 tons to agricultural equipment; 10,598 tons to the automotive industry; 10,485 tons to machinery plants; 1357 tons to shipbuilding; 8551 tons to mining, lumbering, etc.; and 2714 tons to miscellaneous industries. Wholesalers and warehousing accounted for 29,647 tons and exports 26,809 tons.

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1425 tons, General Hospital, Buffalo, through George A. Fuller Co., to R. S. McMannus Steel Construction Co., Buffalo.

1100 tons, generating station extension, Connecticut Light & Power Co., Devon, Conn., through United Engineers & Constructors, Philadelphia, to American Bridge Co., Pittsburgh.

765 tons, bridge over Sasanoa river, Arrowsic-Woolwich, Me., to Harris Structural Steel Co., New York; total bid $238,482.50.

720 tons, Unionport bridge, Bronx, New York, to Bethlehem Steel Co., through William M. Moore Building Co. and Lopier Construction Co., New York City.

620 tons, addition, Schaeffer Brewing Co., Brooklyn, to Bethlehem Steel Co.

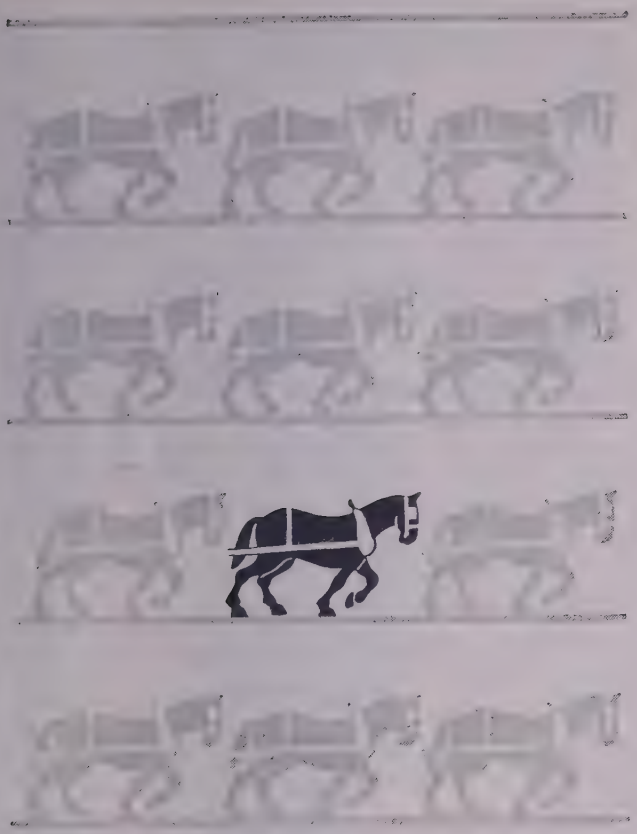
530 tons, Pennsylvania state turnpike section 22-B, Daulphin county, to Bethlehem Steel Co.

475 tons, Erie Railroad grade crossing, Hawthorne, N. J., through Union Building & Construction Co., to Bethlehem Steel Co.

370 tons, store, W. T. Grant, Albany, N. Y., to Bethlehem Steel Co.

365 tons, bridge, South River, Md., to American Bridge Co., Pittsburgh.

360 tons, shelter shed, Pennsylvania Rail-



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270 tons, state bridge, Westchester county, New York, to American Bridge Co., Pittsburgh.

200 tons, St. Thomas parochial school, West Hempstead, Long Island, to Weatherly Steel Co., Weatherly, Pa.

200 tons, service building, Linden, N. J., to Hudson Structural Iron Works, Jersey City, N. J.

190 tons, state bridge, Middlesex county, New Jersey, to the American Bridge Co., Pittsburgh.

160 tons, factory, through Leo F. Caproni, New Haven, Conn., to Bethlehem Steel Co.

150 tons, building, Bay Shore, Long Island, through Fred T. Ley, New York to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

105 tons, South Side Hospital, Bay Shore, Long Island, through Fred T. Ley, New York, to an unnamed fabricator.

100 tons, extension crane runway, Midvale Co., Philadelphia, to Bethlehem Steel Co.

STRUCTURAL STEEL PENDING

3705 tons, state bridge work, Route 763, section 2A, Allegheny county, Pennsylvania; bids Sept. 30; also 566 tons of reinforcing steel.

1200 tons, housing project, South Boston, Mass.; bids in.

407 tons, state bridge work, Route 763, section 2B, Allegheny county, Pennsylvania; bids Sept. 30; also 400 tons of reinforcing.

396 tons, state bridge work, Route 247, Allegheny county, Pennsylvania; bids Sept. 30; also 127 tons reinforcing.

235 tons, galvanized steel angles, east and west yards, Navy Purchasing Office, New York, inv. 1792, bids Sept. 16; also large quantities of angles, inv. 1793, Sept. 14, and inv. 1794, Sept. 16.

200 tons, state bridge work, Bradford county, Pennsylvania; bids Sept. 30.

180 tons, state road, Hillsboro, Md.; George & Lynch, Wilmington, Del., low on general contract.

150 tons, public school, Lynnwood, Pa.; bids Sept. 13.

200 tons, Rogue river, Oregon state bridge; bids to Portland, Sept. 19.

100 tons or more, Lucky Peak dam; bids soon to U. S. Engineer, Walla Walla, Wash.

100 tons or more, six radial gates and six hoists, Columbia basin project; bids in to Bureau of Reclamation, Denver.

Unstated, two large transit sheds; bids soon to Commission of Public Docks, Portland, Oreg.

Unstated, 400-cell unit addition Oregon state penitentiary; bids Oct. 3 to Oregon State Board of Control, Salem; $550,000 project.

Unstated, 480-foot Ward Cove bridge, Alaska; general contract to Reed & Martin, Fairbanks, Alaska, low $778,822; some materials to be furnished by Public Roads Administration.

Unstated, miscellaneous buildings, Ketchikan, Kodiak, and Ladd Field, Alaska; bids to U. S. Engineer, Anchorage, Sept. 30.

Unstated tonnage, steel towers, Davis dam project, Arizona, spec. 2730; American Bridge Co., low $62,869.92 f.o.b. Pittsburgh.

REINFORCING BARS . . .

REINFORCING BARS PLACED

8000 tons, second unit McNary dam, to Northwest Steel Rolling Mills Inc., Seattle; McNary Dam Contractors, general contract.

100 tons, miscellaneous school and industrial construction to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

700 tons, Lucky Peak dam; bids soon to U.S. Engineer, Walla Walla, Wash.

Unstated, 14-story addition to Medical-Dental Bldg., Seattle, $1,300,000 project; general contract to George E. Teufel, Seattle.

Unstated, $750,000 store and office building, Portland, Oreg., planned by Lloyd Corp.; bids soon.

PLATES . . .

PLATES PLACED

665 tons, cone roof tanks, Socony-Vacuum Oil Co., New York, to Chicago Bridge & Iron Co., Chicago.

650 tons, oil storage tanks, Seattle terminal, Standard Oil Co. of California, to Chicago Bridge & Iron Co., Chicago.

150 tons, oil storage tanks, Seattle terminal, Standard Oil Co. of California, to Puget Sound Sheet Metal Works, Seattle.

PIPE . . .

STEEL PIPE PENDING

Unstated, 6400 feet 2 to 12 inch steel water pipe and accessories; some materials to be government-furnished; bids to U. S. Engineer, Walla Walla, Wash., Oct. 4.

CAST IRON PIPE PLACED

1500 tons, 12, 14 and 16-inch cast iron pipe, Williamantic, Conn., to United States Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

Unstated, 33,000 feet 2 to 8 inch, cast iron pipe or alternatives, also deep well pump and steel storage tank; bids to Frank B. Laird, secretary, District No. 64, Auburn, Wash., Sept. 14.

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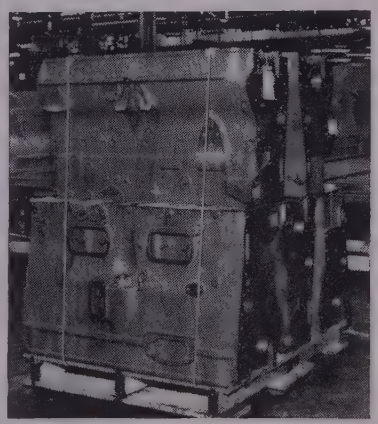

Diesel engine crankcases are palletized for interplant movement. Load weighs 3800 lbs., is firmly secured to the pallet by two Gerrard Steel Straps. Photo courtesy International Harvester Company, Industrial Power Division.

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UNITED STATES STEEL

CONSTRUCTION AND ENTERPRISE

DISTRICT OF COLUMBIA

WASHINGTON — Federal Power Commission has authorized Tennessee Gas Transmission Co. to construct a natural gas pipeline from Kentucky to Buffalo; cost $90 million.

ILLINOIS

CHICAGO—Texas Illinois Natural Gas Pipeline Co. has filed with Federal Power Commission for authority to construct and operate a 1018-mile natural gas line from Texas to Joliet, Ill.; approximate cost $98,966,700.

MISSOURI

CARROLLTON, MO.—City officials are contemplating calling an election late in 1949 or early next year on a $180,000 bond issue to finance construction of sanitary sewer improvements and a sewage treatment plant; John C. Pritchard, 5137 Waterman Ave., St. Louis, consulting engineer.

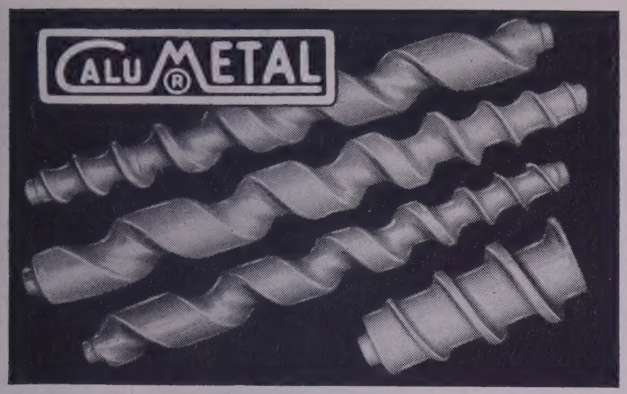
ST. LOUIS—General Cable Corp. has awarded a $220,000 contract to H. B. Deal & Co. Inc., 5517 Manchester Ave., for alterations and improvements to its factory building at 4121 N. Kingshighway Blvd.

ST. LOUIS—Mallinckrodt Chemical Works, 3600 N. Second St., has awarded a $70,000 contract to Dickie Construction Co., 520 Louderman Bldg., 317 N. 11th St.

ST. LOUIS—Hyman Rubin, 3224 N. Second St., has awarded a contract for a warehouse at 7302 Bulwer Ave. to Juengel Construction Co., 201 Worthington Bldg., Affton, St. Louis.

NEW YORK

SYRACUSE, N. Y.—Veterans Administration is accepting sealed bids for construction of



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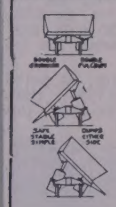

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122 South Michigan Avenue, Chicago 3, Illinois

a 500-bed general medical and surgical hospital to be built on a site adjoining the University of Syracuse medical school. Deadline for bids is Oct. 25. Veterans Administration will accept separate bids for general construction, including roads, walks, grading and drainage, mechanical work, outside distribution systems and the like; electric elevators and dumbwaiters; and refrigerating equipment.

NORTH CAROLINA

RALEIGH, N. C.—Pittsburgh Plate Glass Co. received bids Sept. 6 in office of James M. Edwards Jr., 1207 Insurance Bldg., architect, for sales room and warehouse, corner Boylan avenue & Hargett street.

OHIO

CANTON, O.—Diebold Inc., which has contracted to sell its No. 2 plant at 2647 Navarre Rd. S.W. to Truscon Steel Co., reports all operations and machinery and equipment of the No. 2 plant will be consolidated with those of the No. 1 plant at 818 Mulberry Rd. S.E. at an expenditure of approximately $200,000.

HUBBARD, O.—Ohio Potteries Corp., a newly organized firm, is considering plans to build a manufacturing plant. The company has picked a site and expects to close its financing plans soon. It is headed by A. C. Cochran, president and general manager. Fred Bailey will be production superintendent for the new plant.

OREGON

PORTLAND, OREG.—Lloyd Corp. plans construction of a $750,000 store and office building, part of which will be leased to J. C. Penny Co.; plans by architect, Whitehouse, Church, Newberry & Roehr.

PORTLAND, OREG.—Commission of Public Docks has had plans prepared and will call bids in near future for three transit sheds; plans include double rail tracks, cranes and other equipment.

PORTLAND, OREG.—Westinghouse Electric Corp. is apparently low, $2,094,979, for two 55,555 kva generators for Detroit dam, delivery Feb. 1 and July 1, 1953. U. S. Engineer has called bids Sept. 27 for furnishing six 29,000 kva transformers for Detroit dam powerhouse, estimated cost $750,000. Specified deliveries are July, 1951 and November, 1952.

SALEM, OREG.—Board of Control has issued plans to selected bidders, tenders to be received Oct. 3 for furnishing a 400-unit cell block addition to state penitentiary. A similar unit just installed, cost $550,000.

PENNSYLVANIA

BETHAYRES, PA.—W. H. Butterworth & Sons Co., textile machinery manufacturer, is starting construction of a gray iron foundry at its plant at Bethayres, a Philadelphia suburb. Scheduled for operation in March, it will replace the existing foundry, thus providing increased capacity and more modern facilities. The company also will build a machine shop addition at Bethayres. The new program will cost about $500,000.

SOUTH CAROLINA

NORTH CHARLESTON, S. C.—Shell Oil Co. has plans in progress for a plant expansion.

SUMTER, S. C.—Segalock Fasteners Inc., division of Segal Lock & Hardware Co., has a permit for rebuilding burned building, 2001 Chesapeake Ave.; D. J. Rose & Son, Rocky Mount, N. C., general contractor.

TENNESSEE

MEMPHIS, TENN.—Capital City Products Co. received bids Aug. 29 in office of Raymond B. Spencer & Associates, First National Bank Bldg., architect, for office and warehouse, South Parkway.

MEMPHIS, TENN.—A-H Truck Line has awarded a contract to William Culbreath, Porter Bldg., for a truck terminal, corner of North Second street and Seventh avenue; Northern, Perrell & Windrom, 236 Court Ave., architect.

TEXAS

AUSTIN, TEX.—City, Guiton Morgan, city manager, received bids Aug. 31 for a main power plant structure, contract 13B; Burns & McDonnell Engineering Co., Kansas City, Mo., consulting engineer.

TYLER, TEX.—A. F. Thompson Mfg. Co., Huntington, W. Va., will consolidate its operations in Tyler as soon as expansion of facilities are completed.

WACO, TEX.—Southwestern Greyhound Lines, 905 Commerce St., Fort Worth, Tex., has awarded a $175,000 contract to Munn & Sons, 5319 Junius St., Dallas, for a bus terminal.

VIRGINIA

ROANOKE, VA.—Magic City Launderers & Cleaners Inc., C. E. Tudor, president, is considering rebuilding laundry destroyed by fire which may involve an expenditure of $300,000, including machinery and equipment.

WASHINGTON

SEATTLE—Bids for four Alaskan military projects totaled $1,848,936. Engineer's estimates were $2,225,583. Apparent low bids are: Substation construction and underground transmission system, Fort Richardson, City Electric Co., Anchorage, $132,000; roads, streets and drainage system, Fort Richardson, also sewage and water treatment plants, Ladd air base, Morrison-Knudsen Co. and Peter Kiewit & Sons, $675,689 and $863,247, respectively; wells and fire protection facilities, Eielson field, Benson Moutin Inc., Oklahoma City, Okla., $178,000.

WEST VIRGINIA

MOUNDSVILLE, W. VA.—United Zinc Smelting Corp., New York, contemplates establishment of a new-type smelting plant.

ALASKA

ANCHORAGE, ALASKA—U. S. Engineer has called bids Sept. 30 for transmitter building at Ketchikan, Alaska, receiver building at Kodiak, Alaska, and insulated shop at Ladd Field near Fairbanks, Alaska.

JUNEAU, ALASKA—Public Roads Administration awarded contract to Reed & Martin, Fairbanks, Alaska, low $778,822 for road projects including 480-foot Ward Cove bridge, some materials to be government-furnished.

PRICES OF LEADING FERROALLOYS PRODUCTS

(Continued from Page 173)

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C. 0.10% max.) Ton lot $1.28, less ton $1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot. add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, M 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.55c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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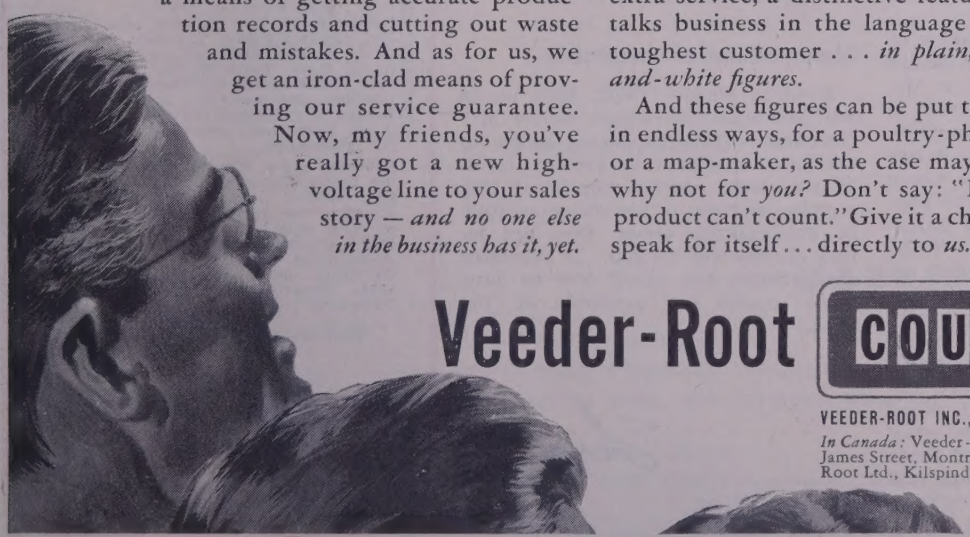

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Behind the Scenes...

IMPORTANT NEWS!

For many months now the editors have been working on a major project. We hinted a couple of weeks ago that something new was on tap, and this week we have the happy task of unveiling it. It's our new price section, which in the opinion of people who have seen it is the finest directory on steel prices and sources of supply which has ever been put together. We'd hate to have to compile a tabulation of the number of hours of work which have gone into its construction. Not only our staff but steel men all through the industry have worked on it, aiming at the goal of a complete and accurate table of who makes what types of steel products and what the prices are. It will be a regular feature of STEEL from now on, and you'll find it replacing our former price tables, at the start of the market section. Hope you like it—if it helps you, we'll be happy!

It's Positively Magnetic

Walt Campbell, our news editor and an inveterate fisherman, sends down a note to the effect that the metalworking industry has contributed further to the well-being of those anglers who use dry flies. Seems that some sharp hookster at General Electric has developed a gimmick which will replace the felt hat. It's a fly box with a built in permanent magnet, room for 36 flies. Guaranteed to let you remove flies from the box without having to remove the hooks from your fingers afterward.

By The Old Mills Dream

In Butler, Pa., nearly a quarter of a century ago the first act of a drama unfolded. The last act is on the boards right now, and the curtain is about to come down. We could probably call it a comedy, because it has a happy ending—but perhaps there are a good many old-timers who consider the passing of the hand mill a tragedy. Recent notes in STEEL point out the demise of the last remaining mills, once counted in the hundreds. There will undoubtedly be a few scattered units left for experimental rolling and for specialty steels, but as a production unit, the hand mill finally gasped and rolled its last with the demise of the gray market. The men who operated these units—the rollers, the catchers and their helpers—were giants among men. They're almost legendary figures now, relics of an era when steel production was a more personally competitive game than it is today. The giant continuous mills of today turn out more and better steel for more people at a lower cost—and that's the happy ending of the drama—but the operators of today's strip mills are engineers, not craftsmen, and the hero is the maintenance man who keeps the mill rolling, not the deft, muscular figure of a head roller, driving his crew to new production records through sheer physical force. Sweat glistening in the red glow of heat radiated from the hot sheet bars, these men represented teamwork trained to a perfection unapproached by the best coached football team. It had to be—because a misplay by any man on the team meant not only loss of tonnage and its subsequent loss of pay, but in many cases loss of life itself. Red hot steel running loose isn't a pleasant toy in any case, but when it has to be controlled by the hands of men working in close proximity, it becomes a constant potential enemy ready to strike at the slightest slip. From nearly every standpoint, today's sheet mills are vastly superior to the old hand mills. Today a steel mill is one of the safest places in America for workers, and certainly the physical effort required to roll steel is negligible compared to the needs of a quarter century ago. Better products at lower cost mean more and better jobs, at better pay and shorter hours. Consequently, few tears are being shed at the passing of the last hand mills from the production scene—there remains only the nostalgic memory of a spectacular human effort.

Sheet Material Available

Readers Service Dept. asks us to tell you folks that copies of the McGranahan article on sheets and strip are now available in reprint form. If you have ordered copies of this popular segment of our Fundamentals of Steelmaking series, they are by now on the way to you. If you have not ordered, but would like to have same, copies are available at 75c each.

Shrdlu

(Editorial Index—page 35)

STEEL

Vol. 125—No. 12 September 19, 1949

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